# THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. MAY 5, 1898. CHICAGO, ILL. NUMBER 18



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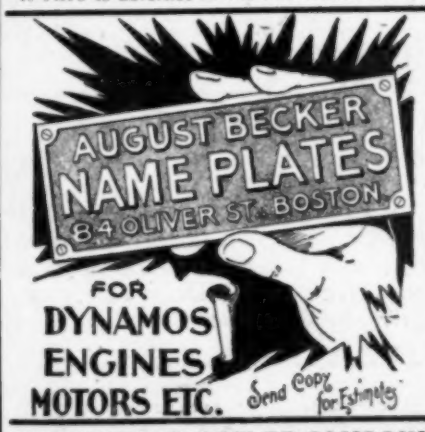


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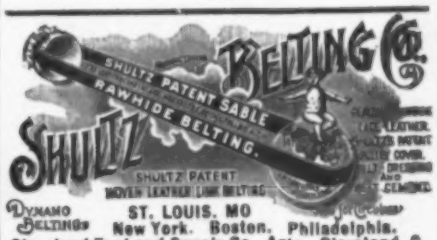


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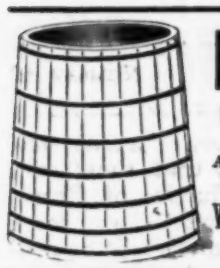

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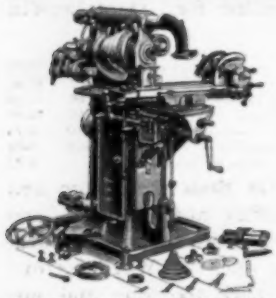

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# THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. MAY 5, 1898. CHICAGO, ILL. NUMBER 18

## THE WEEK IN IRON CIRCLES.

### THE MARKET AT LARGE.

The war news of the week has done much to strengthen the belief that the iron trade is not to suffer long or seriously from hostilities. It has made confidence contagious and has reinforced the opinion of those who refuse to take alarm from any war developments thus far. Yet there is no disputing the suspension of certain projects, nor the postponement of buying in certain lines. Pipe works, for example, know of thousands of tons of orders that will not come to them until there is practically an end of the conflict. Pittsburg, in spite of all held-up business, has been a center of confident feeling and, in finished lines, of considerable activity in the past few days; and Chicago has been but little behind. Cincinnati has had the largest week of pig iron buying since the beginning of the year. There is no question, in spite of the indications of quietness here and there, that the general tone of the situation is stronger than at any time since war became a probability. The fact of war has improved conditions created by the fear of it. The extraordinary activity of plate mills is the feature of current operations. Many are booked for several months ahead, and Government requirements have caused special pressure in the past month. Advances of $1 to $2 a ton are quoted, and deliveries are difficult to guarantee. The influence of Government buying on the iron trade has been farther reaching than appeared probable, and varied and important interests have shared in the business which already has run into millions. Apart from shape and bar mills, the prospect for full occupation of the country's rolling capacity continues excellent. Western bar mills, in response to car works and agricultural demand, have been much better employed than those in the East, but prices continue to show how production overlaps even so large a consumption as that of 1898. Chicago Drainage Canal work amounting to 10,000 tons is about to be placed, and recent bridge, shipyard and boiler work demands will keep Pittsburg and Eastern plate mills well occupied. The situation in pig iron, apart from good Cincinnati and Chicago sales—the latter going almost entirely to Southern furnaces—remains the same. There has been some concession from Southern schedules, on large deals, but generally prices are held. The working out of the New York plans for improving the condition of producers of foundry iron will take time. Buyers would be perfectly willing to see a healthier market, if assured that it could be maintained. There is no question that foundry furnace operation has been a losing proposition to a majority of producers since 1895. Buying of foundry iron, apart from pipe works requirements, which account for a large part of the late Cincinnati business, has been light in the Central West and the East. Some foundries report the outlook not so promising as in recent months, though in most cases current output is very large. The probability that there will be further curtailment in the production of Bessemer pig iron in the Central West may cause some restriction in coke production. Stocks will be considerably less by another month, and while, for the time being, the $10 furnace price has cut off buying directly from producers, there is every confidence that that figure will be established. There are indications this week that buyers are about to come into the market. The new freight rate on ore from Lake Erie port to valley furnaces is 59 cents, or 3½ cents less than in 1897; to Pittsburg, 98 cents, or 7 cents less.

### PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
808 TRADESMEN'S BUILDING, May 4.

The number of projects delayed by the war and the resulting uncertainty in money, increases. A local pipe mill has 15,000 to 20,000 tons held up and the proportion in other lines is fully as heavy. Notwithstanding this, the mills are working to their full capacity and in plates and sheet bars are behind. The week has seen a falling off in new business but an increase in orders on contract.

PIG IRON.—There have been several inquiries for Bessemer iron in the last few days in the shape of offers of $9.65 for prompt shipments, but no sales occurred. The furnace interests are still a unit and little is seen of the iron in middle hands. The result so far has been almost total inactivity, but there are now indications that buyers are feeling the market, preparatory to buying. Gray forge holds steadily to $9.25, Pittsburg, but is not much called for. Quotations in Pittsburg are as follows:

| | | |
|---|---|---|
| Bessemer, valley | $ 9.75 to | 10.00 |
| Bessemer, Pittsburg | 10.40 to | 10.65 |
| No. 1 Foundry | 10.40 to | 10.50 |
| No. 2 Foundry | 9.90 to | 10.00 |
| No. 3 Foundry | 9.50 to | 9.75 |
| Gray Forge, valley | 8.75 to | 8.85 |
| Gray Forge, Pittsburg | | 9.25 |

STEEL.—Billets are relatively weaker than sheet bars and are quoted at $15 maker's mill Wheeling and Pittsburg, and lower prices are reported. There is much complaint over sheet bar deliveries from the valleys and the Wheeling district. Specifications have been held back too long and now each specification calls for immediate delivery. Sheet bars are quoted at $17 valley, Wheeling and Pittsburg maker's mill. Rod mills are running very light and a number are out. The price quoted on rods is $21 at mill, and some quotations are slightly lower.

STRUCTURAL MATERIAL.—The specifications on contracts have been unusually heavy in the past week, but a falling off is noticed in new buying. The new work is not needed now at either local mill, as both are comfortably fixed. As for weeks past, structural work is producing very few orders of any size and for this reason every turn in National affairs is anxiously awaited. Pool quotations are made as follows: Beams and channels, 3 to 15 inches, 1.15c; 18 to 24 inches, 1.25c; tees, 1.20c; zees, 1.15c, and angles, 1.05c. Universal plates in connection with shapes are selling at 1c; alone, at 1.10c.

SHEETS.—A scarcity in black sheets now seems very likely by June. Buying is stronger but an immense tonnage is waiting till the last moment, and when the season is fully developed a rush for material seems more than likely. No. 28 is quoted at 1.95c and galvanized are quoted at six tens and 7½ off list.

BARS.—Mill quotations on steel bars vary. Two interests ask 1c, but 95c has been shaded elsewhere. Bar iron is still selling well and bringing 95c in the valleys.

PLATES.—The railroads are buying heavily and apparently few requirements of this kind are kept back by the war. Within the week the Lehigh Valley ordered 15 locomotives and the Southern 12, and boiler and fire box plates are partly

bought, some coming to Pittsburg. On tank plate sellers report no trouble in holding 1.10c and the very heavy run of small orders keeps up. The local mills are well sold ahead and are quoting: Tank, 1.10c; shell, 1.20c; flange, 1.30c; fire box, 2c and upwards.

PIPES AND TUBES.—The work held up because of uncertainty and tightened money market is very large. One Pittsburg mill has between 15,000 and 20,000 tons of work assured that just now is being postponed on account of the war. The buying of merchant pipe is heavy, but even in smaller sizes orders of a good size are very rare. The six tens and 5 per cent now quoted by agreement of the manufacturers is generally held and will probably be reaffirmed at the meeting on Wednesday. No advance in prices is thought likely, unless the Spanish trouble should show signs of long duration. The base discounts are: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. Discounts on merchant boiler tubes are as follows: 2¼ inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off.

IRON AND STEEL SKELP.—We quote: Grooved steel skelp, 1c to 1.05c; sheared steel skelp, 1.05c to 1.07½c; grooved iron skelp, 1.05c to 1.10c; sheared iron skelp, 1.12½c to 1.15c. All four months, f. o. b. buyers' mills, or 2 per cent off for cash.

SPELTER.—Spelter is weaker and we quote prime western at $4.10 and $4.12½.

FERRO-MANGANESE.—Domestic ferro-manganese is still bringing $49.50 and $50, although the famine conditions in the market are easier. The rumor that the Pittsburg producer has been a buyer of foreign is denied.

SPIEGEL.—Spiegel is firm at $23.50 and $24.

RAILS AND TRACK MATERIAL.—Rails are quiet at $18, Pittsburg, and track material is quoted as follows: Iron track bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.20c.

OLD MATERIAL.—The largest sales of the week were in rails, 1,000 tons of iron rails bringing $13.75 gross in the valley, and 1,000 tons of steel rails bringing $10.50 gross. Wrought scrap sold at $11.50, net; wrought turnings, $7.50, gross; No. 1 cast, $9.25, gross; heavy melting scrap, $10.50, gross; cast borings, $6, net. Other quotations are: Car wheels, Pittsburg, $10.25, gross; heavy melting stock, $10.75, gross; cast borings, $5.75; billet and bloom ends, run of mill, $11; wrought turnings, $7.50, gross; busheling scrap, $9.50, net; machine scrap, $9, gross.

## CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.*
27 VINCENT ST., May 4.

Iron ore is coming down faster than dock and furnace interests care to have it. Vesselmen have been clamorous for cargoes on their contracts, but docks are carrying large stocks and furnacemen generally have been unwilling to take direct ore, waiting for the announcement of the new rail rate effective May 1. Instead of the 62½c rate of 1897 to the valleys, 59c has been announced in the past week, and the Pittsburg rate is 98c instead of $1.05. For direct ore the rebate is 12 cents. Another reason for the slowness of some furnaces to take their 1898 ore is the probability that some of them will be banked in the next 60 days, so that their requirements will not be as large as usual in the early part of the season. The sale of non-Bessemer ores has been steady of late and like those of Bessemer grades has reached a volume beyond the record at the opening of navigation. Mesabi transactions still wait, for the most part, though some conditional trades are talked of, and quotations have been accompanied with a proviso that if any better price is to be had, negotiations may be modified in view of it.

PIG IRON.—The $10 figure of the furnacemen seems to be a complete embargo on direct business in Bessemer iron, for the time being. There remains some iron in the hands of dealers and some stocks secured on conversion deals. This is sold at 25 to 35 cents below furnace prices. It is expected that the heavy consumption still going on and the possible further curtailment of production will show a considerable reduction in furnace stocks on June 1. The trade in foundry iron is quiet, though the melt is heavy. Cleveland foundries running on light work are now in the height of the active season, while those making a specialty of heavy castings are unusually busy on Government and sugar machinery castings. Valley furnaces selling in this market are holding to $9.75 and $10, respectively, as the basis for No. 2 and No. 1 at furnace, in some instances; with others, $9.50 is the basis for No. 2. Gray forge is unchanged at $8.75 valley furnace. River Furnace, Cleveland, which was banked two weeks ago, for connections with new stoves, will start again in another week, but will make Bessemer instead of foundry iron.

| | | | |
|---|---|---|---|
| Bessemer, second quarter | $10 65 | Valley Scotch No. 1 | $10 65@10 70 |
| No. 1 Strong Foundry | 10 65 | Valley Scotch No. 2 | 10 25@10 40 |
| No. 2 Strong Foundry | 10 15 | Gray Forge | 9 45 |
| No. 3 Foundry | 9 65 | Lake Superior Charcoal | 11 50 |

BILLETS.—A local inquiry for a quantity of ingots is reported. Local rod and wire mills are likely soon to be buyers of billets, and it will then be demonstrated whether the new wire company will secure its steel supplies close at hand. We quote billets at $15.25 and tin plate bars at $17 to $17.25.

FINISHED MATERIAL.—One local building calling for 1,000 tons and upwards is postponed, awaiting the issue of the war. Structural business is light but it is the only line in which there is any noticeable let-up in demand. In steel bars a steady business is being done. Current requirements of nut and bolt works amount to a considerable tonnage and agricultural demand for bars has kept up well. We quote steel at 1c to 1.05c, Cleveland, in large lots; iron bars at 1c. Store sales are at higher figures. Black sheets are sold at 2c to 2.05c for No. 27. There is no change in wire and wire nails, which are held by leading sellers at $1.10 and $1.30 respectively.

## CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1142 MONADNOCK BLOCK, May 4.

The exciting topic of the week, naturally, is the war. A great deal of speculation is indulged in as to its probable effect, and it seems to be very generally conceded that in any event business in the latter part of the year will be most excellent in all kinds of iron and steel products. A very large buying movement is looked for and a number of the most prominent buyers in this market are trying to forestall any shortage of material or advance in prices that may come, by making heavy purchases at this time. Agricultural implement manufacturers have been the largest buyers in the past week, having taken large quantities of pig iron. A good many of them are figuring on their other materials at present, and may be expected to place orders within the next two or three weeks. The bar mills have had requests for prices from the implement manufacturers on long deliveries, but as a rule they are not at all anxious to take the business offered, at the terms buyers want. Considerable business has been done in various grades of steel, and a number of large contracts will be given out very soon, it is thought. The Drainage Canal trustees are figuring on work which will necessitate the buying of about 10,000 tons or more of structural steel, which will be placed within the next month.

PIG IRON.—One of the largest agricultural implement manufacturers in this territory bought from 12,000 to 15,000 tons of iron last week, all from Southern furnaces. This is business which heretofore has gone to the Northern furnaces, but was given to the South in this case because of the inability of the local furnaces to guarantee deliveries, and because of the very considerable difference in the prices of the two products. In addition to this business several other quite large contracts were given to Southern furnaces, notably one of 2,500 tons, placed by another implement manufacturer. The local furnaces have done comparatively little business, and only in small lots. Small orders of iron are very frequent and made a good total last week. There are still a number of inquiries in hand, for both large and small lots of iron. Furnaces expect sales to be good continuously, and judging from the way foundries in this district are using iron, their expectations are in a fair way to be realized. The local furnaces are probably in better shape than they have been for a long time, as regards their order books. It is not likely that they could accept any business of more than moderate size for delivery within the next six months, or longer, and at the same time they are having no difficulty in disposing of what small surplus they may have, from week to week. The market continues strong, and predictions are made that there will be a general advance in prices before long. The Southern fur-

naces outside of the combination are no longer selling under the association prices, but are maintaining them.

| | | | |
|---|---|---|---|
| Lake Sup. Charcoal | $11 50@$1 200 | South'n Coke No. 3 | $10 10@10 35 |
| Local Coke Fdy. No. 1 | 11 50@12 00 | Southern No. 1 Soft | 10 60@10 85 |
| Local Coke Fdy. No. 2 | 11 00@11 50 | Southern No. 2 Soft | 10 35@10 60 |
| Local Coke Fdy. No. 3 | 10 75@11 00 | South'n Silveries | 11 25@11 50 |
| Local Scotch Fdy. No. 1 | 11 50@12 00 | Jackson Co. Silveries | 12 50@14 50 |
| Local Scotch Fdy. No. 2 | 11 00@11 50 | Ohio Strong Softeners | 12 00@12 25 |
| Local Scotch Fdy. No. 3 | 10 75@11 00 | Alabama Car Wheel | 14 00@16 00 |
| South'n Coke No. 1 | 10 60@10 85 | Malleable Bessemer | 11 50@12 00 |
| South'n Coke No. 2 | 10 35@10 60 | Coke Bessemer | 11 50@12 00 |

BARS.—Sales of bar iron and steel last week included several quite good contracts. There are a good many inquiries in the market, and it is thought some of these will be placed soon. Agricultural implement manufacturers have been figuring lately, but do not find many of the mills willing to meet their views regarding deliveries under the present prices. Some consumers are anxious to contract for their needs for the next 15 months, while the mills are not so anxious to accept orders of this kind. Meanwhile the market is firm at last week's quotations. Common iron is quoted at 1.05c to 1.10c; guaranteed, 1.10c to 1.15c; soft steel bars, 1.15c to 1.20c.

RAILS AND TRACK SUPPLIES.—Only a small business was done last week, in either light or heavy sections. The mills are busy filling old orders. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.15c to 1.25c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.50c to 1.60c.

BILLETS AND RODS.—Very little, if any business was done here last week. The local mills report no orders, and Eastern mills are not known to have made sales here. In the absence of transactions, billets are quoted at $16.50 to $17, and rods at $23.25 to $23.75.

STRUCTURAL MATERIAL.—No large contracts were placed. Small order business was good, and made a good aggregate. The only new business to come up were two contracts for Drainage Canal work, aggregating 7,000 tons. One of these, for 3,000 tons, is the material for the by-pass along the Chicago river between Monroe and Van Buren streets. This contract will be given out June 1. The other is the reletting of the large bridge over the Canal, which was given to the King Bridge Co., of Cleveland, some time ago, and the contract voided later, because of the objection of the railroads using the bridge to the design selected. Designs and bids for the bridge are being taken now by the Canal trustees, and the contract will be let within the next month. It will take about 4,000 tons of material. Besides these contracts, the Canal trustees will let a contract May 18 for three bridges, taking 3,000 tons of material. This was mentioned in this column recently. The market is very firm, and quotations on sheared plates have been advanced $2 a ton by some mills, although others hold to the old quotations, which we give. Quotations are made as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.20c to 1.25c; plates, 1.15c to 1.20c; tees, 1.35c to 1.40c. Small lots from stock are quoted at ¼ to ½ cent higher.

PLATES.—Two or three good contracts for bridge plates have been placed in the past week, including one order for 2,000 tons. Other business has not been large. Figures have been made on over 6,000 tons of ship plates, but the contracts in some cases have been held up pending the settlement of the war. Prices are made as follows: Tank steel, 1.15c to 1.20c; flange steel, 1.20c to 1.40c; fire box steel, 1.85c to 5c.

SCRAP.—Some business has been done, but it is nearly all in small lots. Supplies of scrap appear to be increasing, and there is not the shortage there was three or four weeks ago. Consumers apparently are not anxious to place large orders at present. Dealer's selling prices are as follows:

| | | | |
|---|---|---|---|
| Old iron rails, gross | $12 00@$12 25 | Axles, net | $14 25@$14 75 |
| Old steel rails, long, gr. | 10 50@11 00 | Cast borings, net | 4 00@4 25 |
| Old steel rails, short | 9 00@9 25 | Wrought turnings, net | 5 50@6 00 |
| Old wheels, gross | 11 00@11 50 | Axle turnings, net | 6 25@6 75 |
| Railroad forge, net | 12 00@12 50 | Mixed steel, gross | 7 25@7 50 |
| Dealer's forge, net | 10 50@11 00 | Stove plates, net | 6 00@6 25 |
| No. 1 mill, net | 7 50@8 00 | Heavy melting steel, gr. | 8 25@8 50 |
| Heavy cast, net | 8 50@9 00 | Old iron splice b., net | 13 25@13 50 |
| Malleable cast, net | 8 00@8 50 | | |

SHEETS.—Considerable business was closed up last week, most of it in comparatively small lots, although several good contracts were closed. The demand is large, and indicates a continuance of good business. Quotations are made at 2c to 2.10c for No. 27, black, and 80 and 10 per cent discount for galvanized.

MERCHANT STEEL.—Business has been quite active, and several good contracts were closed last week. There are a number of large inquiries in the market which will undoubtedly be settled within a short time. The implement manufacturers are taking prices on considerable material. Prices follow: Open-hearth spring, tire and machinery steel, 1.60c to 1.70c; smooth-finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.50c to 1.60c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

## PHILADELPHIA.

May 3.

The pig iron market is in a waiting condition. Producers find an argument for a better prospect in the unanimity of the New York convention of producers of foundry and forge irons; but time will be required to mature plans now proposed and to secure actual signatures of producers. It is believed that the association will be effective in preventing demoralization, and may succeed in giving some life and strength to the market, that would be a welcome variation from the long run of unsatisfactory prices and in too many cases, attendant losses. It is certain, whatever the effects of the war, that pig iron will not go lower, and if some provision could be made to distribute the expense of blowing out or systematically banking enough furnaces to prevent accumulations, there is a good chance of securing the much needed advance. Buyers are not disposed to anticipate their wants, feeling that a few weeks will give a better insight into the future. The sentiment regarding the effect of the war is very hopeful. Structural mills are feeling the effect of suspended work already, but otherwise there is little evidence of interruption. Plate mills are very well supplied and are asking from $1 to $2 a ton more on new business, without making any very definite promises of deliveries. There is a more general belief since the news of the operations in the Philippines, that business will not have to stand the strain of a long protracted war. Bars are the dullest line in the finished material market. Mills rolling iron are running only part time. Some foreign business in steel bars is up, but is not yet closed. Activity in various lines, on Government work is still a noticeable feature. Steel billets are in little demand, consumers being covered ahead for the most part. Business could doubtless be done at $17. We quote pig iron and finished material prices as follows: No. 1X foundry $11.50 to $11.75; No. 2X, $10.75; No. 2 plain, $10.25; standard mill iron, $10 to $10.25; ordinary, $9.75; basic, $10. Refined bars, 1.10c to 1.15c; common bars, 1.05c; soft steel bars, 1.10c; plates, 1.20c to 1.25c; angles, 1.20c; beams and channels, up to 15 inches, 1.30c.

## CINCINNATI.

May 4.

Matthew Addy & Co. say of the past week in the iron market: "Business continues excellent. There has been during the past week a very large volume of business booked for Southern pig iron. It is probable that in Cincinnati alone not less than 50,000 tons of pig iron have been sold and most of it for comparatively near-by delivery. While there have been some lots of iron offered at less than schedule prices, yet the greater part of this iron has been sold at full combination figures. There is no question but that in spite of the gloomy way in which the month of April opened that it has in tonnage and in prices proved the best month thus far that the Southern furnaces have had this year. There is every reason to believe that May is going to be as good, if not better. The feeling of encouragement that now pervades the market is a distinct feature of the situation." In their weekly review, Rogers, Brown & Co., say: "The iron market during the past week has been of an especially interesting nature, on account of several large deals which are yet pending. Smaller consumers are buying as their wants require for early delivery, but some of the largest melters are testing the market for round lots, scattered delivery through six months or more. If the usual course of the market holds good in this case, the rank and file of trade will follow the leaders and there will be a heavy tonnage booked during the coming month. A local consumer is reported to have bought 25,000 tons of No. 4 foundry and gray forge. Most of the Southern furnaces are in good condition now so far as orders and stocks on hand are concerned, and if the negotiations in progress come to a conclusion, in the way to sales, the Southern producers will be well sold ahead. There seems to be no probability of any increase of production in Alabama. Two furnaces have recently gone out of blast and only one started. There is also a fair demand for Lake Superior charcoal iron, and because of scarcity of old wheels, the call for high grades has been very heavy. A few consumers of iron claim that contracts have fallen off in a marked degree during the past three weeks, but in the aggregate we think consumption is holding up, and that further decrease in stocks will be shown at the end of the month."

# THE IRON TRADE REVIEW

AND

## INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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### STANDARDS FOR FOUNDRY AND FURNACE.

One very evident result of the foundry association regime of the past five years is the movement for a better understanding between the foundryman and the maker of his pig iron. There is no question that the steel-maker, with his thorough dependence upon chemistry, and his more exacting requirements of the furnaceman, has done much to make the laboratory an important adjunct of the blast furnace. In the past few years the foundryman has caught something of the spirit of the steel works and has been telling the furnaceman what sort of iron he wants, instead of relying upon the pig iron salesman to make his mixture or when he is in trouble, to find him the brand of iron that will work a cure. There has been a dispostition on the part of some pig iron selling firms to look upon the foundry association, with its flood of foundry literature and discussion, as a disturber of existing relations between buyer and seller of foundry iron. Not that the furnace is unwilling to furnish what the foundryman calls for, if he knows what he wants and why he wants it, but it has been found in some cases that lack of thorough knowledge has caused no little trouble. The doctrine has been pretty generally preached that the old procedure has been hap-hazard and unscientific; but the foundry world in general has not come into a full mastery of the new.

Grading and making mixtures by fracture and grain have been proved unreliable; but the average foundry, with no chemist of its own and not yet educated to the point of occasionally going to the chemist for help about its mixture, is not in position to make use of the analysis card which it has become more and more the fashion to ask the furnace to send with each shipment. And the furnaces, knowing that in many cases the foundry has no arrangement for checking their chemical determinations, have not been in haste to carry into the manufacture and grading of foundry iron the accurate methods that belong to their Bessemer practice.

But it is not difficult to see that the chemist as an adjunct of the founder, and a guarantor against the unexpected in his castings, is much more of a factor to-day than five years ago. He has demonstrated his value in this capacity. A score of important foundries could be named who would make ready acknowledgment of the money value of the chemist's services. Yet chemists, like doctors, disagree, and this fact has had its influence, doubtless, in retarding the movement toward a more scientific basis for making and controlling foundry mixtures. On other pages of this issue are letters from chemists and metallurgists, commenting on the reasons for the variations in results shown in the tables of pig iron analyses, recently presented by Mr. West in a paper before the Pittsburg Foundrymen's Association. It will be seen that there is some disposition to attribute the differences to improper sampling, and yet there is such agreement on the need of more uniformity in chemists' methods as to make a strong endorsement of the proposal of Mr. West.

Coming from a foundryman, Mr. West's proposition naturally does not relate to analytic methods. On this question iron and steel chemists have already taken the initiative. But the preparation of standard samples of cast iron, from which chemists could secure drillings to check their methods, is a desideratum of foundrymen, chemists and metallurgists, and in supplying the need there will undoubtedly be the most ready co-operation. The unanimity with which chemists working in iron and steel have endorsed the proposal, and the favorable attitude of the Pittsburg Foundrymen's Association give indication of the reception the plan will have in other quarters. Its execution will be an important step toward harmonious action by foundries and furnaces in the new movement for scientific foundry practice. The elimination of hap and uncertainty from operations with foundry iron is an object well worth all that the educational movement of the past five years has cost, and all that will be involved in the carrying out of present plans.

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A correspondent endorses the position taken in the editorial "Coming up from the Ranks", in our last issue—that holding up proprietorship as a goal has been somewhat overdone. He adds:

> It used to be a favorite saying of the self-satisfied, that it was "possible for any boy to rise to be President of the United States." This, of course can be shown to be mathematically impossible. The proprietor of the thread mill bearing his name rose from a machinist, who everybody thought was an idle dreamer because he claimed he could do certain things in thread making which he finally did do. He says it is possible for any one to rise to the same position that he occupies. Now his position positively involves a large number of other people in inferior positions, and the whole propostition is absurd as well as mathematically impossible. It is not conceivable to the human mind that everybody should live on "custard pie and soda water."

There can be no controversy, however, on the proposition that every man by industry, a studious habit and a determination to conquer difficulties can greatly increase his skill and efficiency. We are not sure that the current preaching on the pos-

sibilities of employes becoming employers may not be overdone even to the extent of creating discontent because of the small number who reach the goal. We are disposed to consider this preachment of the self-made employer as quite as much a mistake on one side, as the effort of the trade union to create an artificial dead-level condition of fit and unfit, on the other. Let emphasis be put upon merit and achievement, in whatever rank or file it is found, for less and less will proprietorship be possible, though the standard for subordinate places is incomparably beyond that of three decades ago.

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A number of iron and steel companies are among the corporations of the country which have guaranteed that such of their employes as enter the service of the United States in the war with Spain, will find employment in their old places on their return. Yet the iron industry has felt that war might work serious derangement of its plans for 1898, for at no time since 1892 have operations been at a pace so fully occupying all available skilled labor. The attitude of the business and manufacturing interests, now that the die has been cast, is one of hearty co-operation with any plan of the Government that will strike the enemy a telling blow. While neither the way nor the time of the war's beginning commended it to the judgment of many thinking men, there is now a unanimous desire that the Government will so "bear't that the opposed may beware" and that the sacrifices that must be made may purchase the maximum of benefit to Cuba and to the world.

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### Personal.

D. H. Bacon, president of the Minnesota Iron Co., arrived in Chicago last week from Europe, where he has been on a pleasure trip of several months.

The will of the late Isaac A. Sheppard, proprietor of a well known Baltimore foundry, who died a short time ago at Philadelphia, provides bequests of $18,000 to charities, and larger sums are left conditionally to various benevolences.

A. O. Holcomb, of the Topeka Foundry, Topeka, Kan., received serious and for a time supposed to be fatal injuries by being thrown from a bicycle.

T. C. Carson, special agent of the Carnegie Steel Co., Ltd., who for a year has been in China and Japan, returned to Pittsburg this week.

Norman S. Harrington, the American who, according to the press dispatches, distinguished himself by assisting United States Consul Herbert W. Bowen in defending the shield and eagle of the American consulate at Barcelona, April 20, against a mob of 3,000 people, represents the Edward P. Allis Co., of Milwaukee, in Europe.

S. T. Siddall has been made general sales agent of the Union Iron & Steel Co., with headquarters at Youngstown, and James M. Evans has been made Eastern sales agent with headquarters in New York.

Frank Scadden, for a number of years connected with iron mines in the Crystal Falls, Mich., district, has resigned as manager of the Huron Iron Co.'s mines, because of ill health. He is succeeded by M. H. Dyer.

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### Obituary.

John Darragh, Sr., for 22 years connected with the Isabella Furnace Co., Pittsburg, died last week.

James Summers, a pioneer iron manufacturer of the Mahoning valley, died in Struthers, last week. He was a member of the firm of Summers Bros. & Co., before the company became the Struthers Iron Co.

John I. Munson, superintendent of the Davidson coke plant of the H. C. Frick Coke Co., died May 2, from the effects of injuries received in a runaway.

## LAKE SUPERIOR IRON MINES.

The annual report of the Lake Superior Iron Co. for the year ending Dec. 31, 1897, has been published recently. It shows that the net profits of the year were $66,498.16, after crediting depreciation account with $30,000 to offset reduction in valuation of the company's vessels. Certainly there is no indication of prosperity to the iron ore industry in a showing of three per cent net profit on an investment account of $2,100,000, the company's capital stock being $2,500,000, of which $400,000 is treasury stock. Two dividends of $1 a share each were paid in the year. The report of the treasurer, W. D. Rees, says that "the outlook is more encouraging than that of one year ago, for, although prices still remain low, and with very little probability of any material advance, the volume of business will doubtless be large and we hope by increased tonnage to decrease costs somewhat and thereby make a better showing for 1898." The sales of ore in 1897 were 549,687 tons, and 409,883 tons was mined. Shipments from the mines were 376,761 and there was in stock at the mine on Dec. 31, 1897, 145,123 tons. Real estate and mining property appear on the balance sheet at $1,246,445 61 and the company's six steamers at $610,000. The excellent organization and management of the Lake Superior Iron Co., and the strength accumulated in years of better prices, explain its ability to go through, as well as it has, such a test as the iron industry has had in the past half dozen years. But its record is proof of the fact that only strong companies, with resources accumulated in times of prosperity, can carry on business in iron mining on any such basis of prices as now prevails.

It is expected that mining operations will soon be resumed at the Queen Iron Mining Co.'s properties at Negaunee, some concession having been made from the 40-cent royalty provided by the original lease.

The Lake Superior Iron Co., following the practice that has obtained at a number of hard ore properties, will put in crushers to handle its hard ores.

The largest Escanaba cargo of ore for South Chicago was loaded on May 2—6,220 gross tons.

It is reported that John T. Jones has taken an option on Section 17 near Vulcan, Mich., expecting to work its silicious ores.

Operations have resumed at the Traders mine, Iron Mountain, Mich., producing high silica ores.

John G. Brown and W. J. Conan have filed a petition with the Minnesota Board of Railroad and Warehouse Commissioners praying that the ore carrying rate on the Duluth & Iron Range and Duluth, Missabe & Northern roads be reduced to 40 cents per ton from the Vermilion and Mesabi ranges. The petition recites that the 80-cent rate on Minnesota ores was established when ores were bringing nearly twice as much as to-day; that owners and operators of mining property cannot make a profit and pay so high a freight; that the companies owning both railroads and mines make their only profit out of transportation operations, and that rates of freight on other ranges have been reduced. John G. Brown, one of the petitioners, is a part owner of the fee of the Section 26 mine at Ely, upon which the Oliver Iron Mining Co. was recently given an option. He also owns an interest in the fee of the Pioneer. Dr. Wm. J. Conan, of Superior, is a large stockholder in the Pioneer Iron Co., and also owner of an undivided one-half interest in the fee.

Minnesota Iron Co. stock has been stronger lately and has sold up to 63. The company's shipments this year will be the largest on record.

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THE demand for charcoal iron from firms having Government contracts has been well maintained recently. The Superior Charoal Iron Co., of Grand Rapids, Mich., with its "Pioneer," "Elk Rapids," and "Antrim" brands has had a good trade on this account and particularly with concerns making shells. Very satisfactory reports have been received on these brands for this class of work.

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THE Walker Co., Cleveland, has just received a telegraph order from Washington for six 10-inch disappearing gun carriages. They are to be finished by Oct. 1. The preceding order amounted to $50,000; the present one to $100,000. The working force will be increased.

## NILES FACE MILLING MACHINE.

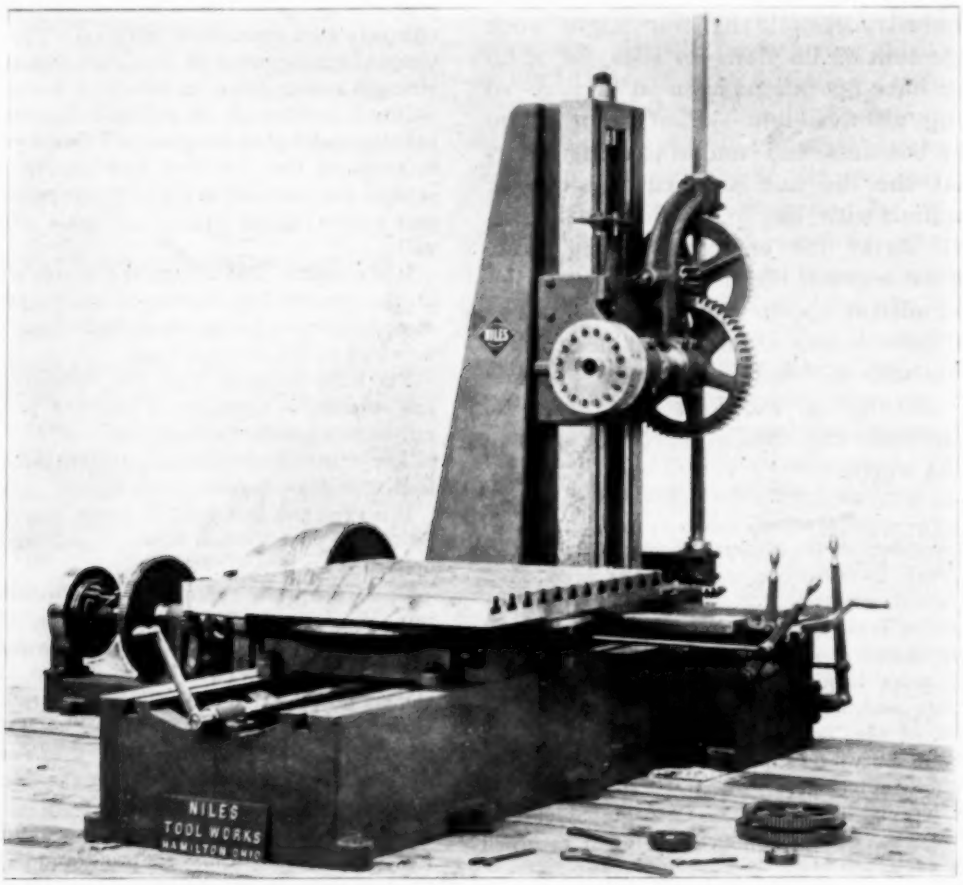
The cut represents a new milling machine, built by the Niles Tool Works Co., of Hamilton, O., that is particularly adapted for face milling. It is arranged for face milling work at several angles, the table being provided with a circular base, by means of which the work, when clamped in place, may be revolved to the several angles required by the surfaces it is desired to mill.

The milling spindle is mounted on a saddle, which traverses vertically on the column. In addition, the column has horizontal traverse on the main bed of the machine. The table has, besides, in-and-out setting adjustment for setting the work at the proper distance from the face of the milling cutter. The end thrust is taken care of by the large solid head of the spindle. The saddle is arranged wtih large bearings on the column for the same purpose. The drive is obtained from the main shaft by means of bevel gears located on the vertical driving shaft of the machine proper. Provision is made for ample power for the heaviest face milling within the range of the machine. All feeds and quick traverse operations are performed without the operator changing his position. Provision is made for change of milling feeds by change gears at the rear.

Power feed for milling is applied to the column traverse on bed, and also to the traverse on the column; by means of which the machine can be used for face milling both in horizontal and vertical directions. In adidtion to the power traverse, the column and saddle are provided with hand traverse motion.

The horizontal and vertical traverse of the saddle is four feet. The shear bed is seven feet long, and is arranged with a four feet square revolving table, with base for same, which is provided with a lock-pin arrangement by means of which it can be easily swung for quarter turn. The cross table is provided witdh longitudinal hand adjustment.

The spindle of the machine is a high-carbon steel forging, of large diameter and long bearings, and is arranged for fastening on milling and facing heads (the facing-heads being provided with star feed) and for No. 6 Morse taper. The milling speed is about 2½ inches per minute. Three milling feeds are provided. Other intermediate feeds can be arranged. The machine shown was built for Warren, Webster & Co., of Camden, N. J. Its weight is 23,000 pounds.




FACE MILLING MACHINE.

### A New Torpedo Manufactured at Chicago.

An aerial torpedo has been invented by Emil and Louis Gathmann, of Chicago, for which an unequalled destructive power is claimed. J. J. Ryan & Co., 68 W. Monroe st., Chicago, are making some of the torpedoes for the United States Government. In the shells that are now used in naval warfare there are 50 pounds of gun-cotton. These are the shells that are ordinarily used in 12-inch guns. The Gathmanns have succeeded in constructing a shell of the same weight and fitted to the same gun which will carry 400 pounds of gun-cotton. The destructive force of this amount of gun-cotton will be to the destructive force of that used in the old-style shell as the square of 50 is to the square of 400, or, as 1 is to 64. The new shell, or torpedo, though it contains but eight times as much gun-cotton, will be 64 times as destructive. The largest torpedo which can be hurled against an American war ship contains 200 pounds of gun-cotton, but the shells which are being constructed by Ryan & Co., will have four times the destructive force of Spain's most formidable projectile.

The new projectile can be hurled through the air like a bullet. It has the advantage that it can be directed in its course by the gunner and can be hurled with irresistible force anywhere within range of the guns from which it is fired. A torpedo has the advantage over any other form of projectile that it is just as destructive at eight miles as at a few hundred feet.

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Goff, Horner & Co., iron merchants, Lewis block, Pittsburg, have accepted the general agency of the Hyde Park Iron & Steel Co., Hyde Park, Pa., manufacturers of fine grade soft steel sheets of all gauges, in widths up to 40 inches and lengths up to 120 inches.

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The Westinghouse Air Brake Co.'s report shows that 16,000 sets of air brakes for freight cars were supplied to railroads in March. Railway companies, it is claimed, are making bona fide endeavors to obey the law requiring them to equip trains with safety appliances.

## PENNSYLVANIA TUBE WORKS ADDITIONS.

The additions which the Pennsylvania Tube Works have been making to their plant at Pittsburg are shown in the two views herewith taken just after the steel structure was completed. The buildings added are for storage purposes and are arranged with a view to rapid and economical loading of pipe. There are two buildings of 520 feet and 400 feet in length, respectively, 21 feet high, and each having a span of

FIG. 1.—INTERIOR VIEW OF ADDITION TO PENNSYLVANIA TUBE WORKS. CONSTRUCTION BY THE RITER-CONLEY CO.

105 feet. Running across the buildings from the river side are six tracks. The pipe will be stored in the buldings according to sizes and lengths and the six tracks will allow the loading of all sizes and lengths directly into cars from both sides. The steel framework, in addition, was designed so that pipe can be handled from the bottom chord of the truss, in loading, if this should be desired.

The construction, which was the work of the Riter-Conley Co., of Pittsburg, is noticeable for the size of the structures and the fact that the work was completed in less than three weeks. The steel framework was erected by means of a traveller, framed of timber and braced with adjustable steel bars, the whole moving on a temporary track laid on the ground. By means of the traveller, which is 70 feet high, the trusses, columns, ventilator frames, purlins and lattice girders were all quickly put in place from one position of the movable structure. The buildings are provided with ample skylight and there are wide continuous ventilators for both spans, consisting of alternate sash and louvres. In every way the buildings are admirably adapted for shipping purposes.

### Quick Work in Replacing a Bridge Span.

The Edge Moor Iron Co. performed an interesting engineering feat at Pittsburg, April 24, in removing a bridge span on the Panhandle Railroad and substituting a new one in an hour and a half. The bridge, which spans a low valley at the suburban station Temperanceville, is 1,200 feet long and is made up of eight spans. From time to time it has been renewed in different places until but two spans of the old structure remained. One span was replaced last Sunday and the same procedure will be followed next Sunday with the remaining span. The bridge builders were allowed from 9:30 A. M. to 5:45 P. M., to do the work, arrangements having been made to take trains over other branches. The first step of the work was the wrecking and getting out of the way of the old bridge. The span to be moved was quickly

FIG 2.—PENNSYLVANIA TUBE WORKS, PITTSBURG.

cut at each end, and then the men began the work of removing the underpinning and supports. In the meantime a force was at work putting down a track upon which not only the old bridge was to be moved out of place, but the new moved into position. A double track made of heavy railroad steel, each track composed of 10 rails, was laid, and on top of this a row of steel rollers. Both the new and the old bridge were blocked up and finally allowed to rest upon these steel rollers. When both ends of the old span had been cut the word was

given and a heavy stationary engine, from which were run massive cables, was put to work. Without check or stop the entire mass of steel composing the new and old spans was moved eight feet. This required two minutes, and the movement placed the old bridge at the extreme northern point to which it could be moved. It was only half-way out of the line of the right of way, and there was yet eight feet to clear before the new steel structure could be dropped into place.

The problem of getting it out of the road was solved by wrecking the entire span. The cross-tie rods and binding bars were cut, and the wooden supports and underpinning knocked loose, and then the big engine was brought into use again. Heavy guy lines were attached to the old bridge and the steam turned on. An instant later the center of the old bridge and the supports lay a mass of twisted beams at the bottom of the gully. The two big girders were then shoved by steam power out of the line of way, upon a heavy trestled support, and the new steel span was moved into place. The remaining eight feet were covered in one minute, and the rails and connections made in 3½ minutes more. The signal was then given and the order went out that traffic was again opened.

The new span is 117 feet 9 inches long and weighs 204 tons. It has three trusses and is pin-and-link connected with stiff bottom and top chords. W. B. Fortune, chief engineer of the Edge Moor Iron Co., superintended the work which was witnessed by a party of engineers from Pittsburg and the East.

### Non-Bessemer Iron Association.

It is estimated that the productive capacity of the furnace companies represented at the New York convention of April 22 and 23, and the adjourned committee meeting of April 25, was 249,800 tons monthly, based on current output, or at a yearly rate of 3,000,000 tons. All question of price was eliminated from the discussion and a resolution was passed not to attempt any arbitrary restriction of production. The producers of foundry and forge iron are quite well agreed that much of the demoralization their trade has suffered in the past few years might be prevented by an organization that merely gathered accurate statistics of stocks and sales, and that replaced uncertainty and rumor by exact facts about the situation. The "National Association of Manufacturers of non-Bessemer Iron," if it shall become a fact, as seems entirely assured, will go farther, however. Limitation of production will be secured through the following unique plan, which was adopted at New York, in the form of a resolution:

"That an assessment of 10 cents per gross ton be paid for the actual make of the furnaces for the month of March, 1898, and from month to month thereafter, of which assessments one half, or so much as the executive committee finds necessary, be used to limit production, and the balance be placed in a general fund until this amount equals $100,000. That this $100,000 fund be deposited at interest in some financial institution and held to be divided pro rata per actual capacity, as a bonus or reward among the members who loyally comply with the requirements of the association, at such date as it be dissolved. That after the accumulation in excess of the amount needed for restriction, reaches $100,000, the amount of monthly assessments per ton shall be fixed by the executive committee, but shall not exceed 10 cents per ton, unless ordered at a general meeting of the association. That the assessments orders, not otherwise provided for, be used to purchase restriction of production. The Executive Committee, to accomplish this purpose, will invite bids to stop from owners of active furnaces, and shall proportion the needed restriction among the lowest bidders. That any surplus over and above the bonus fund or amount needed to limit production be divided pro rata, according to actual make, among the members of the association. That an accurate account of all expenditures be kept and reported monthly to the district associations, and an assessment levied to pay general office expenses."

The plan becomes operative when signatures of firms making 85 per cent of the product of foundry and forge iron have been obtained. Tonnage is the basis of voting and each district is to have a vote for every 10,000 tons. There are eight districts: Tennessee and Alabama, Mahoning and Shenango Valleys and Cleveland, Illinois and Wisconsin, Eastern Pennsylvania and New Jersey, Buffalo, Western Pennsylvania, Virginia, Southern Ohio.

## HEAVY OUTPUT OF STEEL RAILS IN 1898.

The American Iron and Steel Association has ascertained from the manufacturers that the production in the United States in 1897 of all kinds of rails, including light and heavy rails, and street, electric, and mine rails, was 1,647,892 gross tons, against 1,122,010 tons in 1896, an increase of 525,882 tons, or over 46 per cent. The production of 1897 was composed of 1,614,399 tons of Bessemer steel rails rolled by the producers of domestic ingots; 30,121 tons of Bessemer steel rails re-rolled from old steel rails and rolled from purchased blooms; 500 tons of open-hearth steel rails; and 2,872 tons of iron rails.

The total production of Bessemer steel rails in 1897 amounted to 1,644,520 gross tons, against 1,116,958 tons in 1896. Of the production of 1897, Pennsylvania made 1,027,996 tons, as compared with 674,096 tons in 1896; Illinois and the remainder of the country made 616,524 tons, against 442,862 tons in 1896.

Ten States made rails in 1897, namely, Pennsylvania, Maryland, Alabama, Tennessee, Ohio, Illinois, Wisconsin, Colorado, Wyoming, and California. All these States made Bessemer steel rails except Tennessee, Alabama, and Wyoming. The production of Bessemer steel rails outside of Pennsylvania, Illinois, Ohio, Maryland, and Wisconsin was very small. The iron rails were made in Pennsylvania, Tennessee, Alabama, Ohio, Illinois, Colorado, and Wyoming. The open-hearth steel rails were produced in Alabama and California.

Of the total production of rails in 1897, Pennsylvania made over 62 per cent, against over 60 per cent in 1896. Illinois made over 26 per cent, against almost 28 per cent in 1896. These two States made almost 89 per cent of all the rails rolled in 1897, against a little over 88 per cent in 1896. The following table gives the production in 1897 of all kinds of rails. Those weighing 45 pounds and less than 85 pounds to the yard are separated from those weighing less than 45 pounds and over 85 pounds.

| States—Rails. | Under 45 pounds. Gross tons. | 45 pounds and less than 85. Gross tons. | 85 pounds and over. Gross tons. | Total. Gross tons. |
|---|---|---|---|---|
| Pennsylvania | 51,574 | 711,827 | 264,675 | 1,028,076 |
| Ohio and Illinois | 4,589 | 446 622 | 61,920 | 513 131 |
| Other States | 32,733 | 64,986 | 8,966 | 106 685 |
| Total | 88,896 | 1,223,435 | 335,561 | 1,647,892 |

The rails reported to us which are known to have been rolled for street and electric railways in 1897 amounted to 122,244 gross tons, against 145,210 tons in 1896, a decrease of 22,966 tons. With the exception of a few hundred tons, all were steel rails. The following table gives the production of street rails in this country from 1890 to 1897, in gross tons.

| Years. | Gross tons. | Years. | Gross tons. |
|---|---|---|---|
| 1890 | 98,529 | 1894 | 157,457 |
| 1891 | 81,302 | 1895 | 163,109 |
| 1892 | 111,580 | 1896 | 145,210 |
| 1893 | 133,423 | 1897 | 122,244 |

The following table gives the production of all kinds of rails from 1890 to 1897, in gross tons.

| Years—Gross tons. | Iron. | Steel. | Total. |
|---|---|---|---|
| 1890 | 13,882 | 1 871,425 | 1,885,307 |
| 1891 | 8,240 | 1,298,936 | 1,307,176 |
| 1892 | 10,437 | 1,541,407 | 1,551 844 |
| 1893 | 6,090 | 1,130,368 | 1,136,455 |
| 1894 | 4,674 | 1,017,098 | 1,021,772 |
| 1895 | 5,810 | 1,300,325 | 1,306,135 |
| 1896 | 4,347 | 1,117,663 | 1,122,010 |
| 1897 | 2,872 | 1,645,020 | 1,647,892 |

The maximum production of all kinds of rails in this country was reached in 1887, when 2,139,640 gross tons were made. The year of next largest production was 1890, the production being 1,885,307 tons. The next largest year was 1897, the production amounting to 1,647,892 tons.—[Bulletin.

OWING to its large Government orders the Morgan Engineering Co., Alliance, O., has increased hours from 10 to 11. With May 1, the rate of wages in force prior to 1893 is restored.

## BRITISH SHIPBUILDING BOOMING.

Returns which have this week been issued by Lloyd's Register show that the shipbuilding industry is at present enjoying a greater meed of prosperity than it has ever before known. The quantity of work in hand is in all respects phenomenal. The actual tonnage under construction in the United Kingdom at the end of March was 1,185,121 tons, which is an increase of 356,640 tons on the tonnage under construction at the end of the March quarter of 1897. The bounding activity which now prevails in the ship-plate industry is thus easily explained. Some of the leading steelworks in Scotland have even committed the unpardonable national delinquency of "breaking the Sabbath" in order to overtake their engagements, and have thereby come under deep reproaches from the "unco' guid." The fact is that the pressure now being put upon the steelworks to meet the requirements of the shipbuilding industry are unprecedented. Probably the present rate of production of shipbuilding material of all kinds is not less than a million tons a year. The same unusual activity is to be found in the various establishments devoted to the manufacture of marine engines, pumps, cranes, dynamos, and many other mechanical features of a fully-equipped steamship. The demands of our own and other national navies have intensified the heavy pressure put upon manufacturers by the mercantile marine. At the present moment there are 355,934 tons of British and foreign warships under construction in the United Kingdom, of which 238,505 tons are for our own navy, and 117,429 tons are for foreign navies. The Elswick Works alone have on hand 79,987 tons of warships building, of which only 2,135 tons are being supplied for the British Navy—a figure which sufficiently proves the extraordinary resources of some of our private arsenals. The value of the shipbuilding business on hand at the present time will probably be about £30,000,000 assuming merchant vessels to cost on an average of £10 per ton and warships to represent an average of £50 per ton. These figures are sufficiently indicative of the vast importance of this branch of industry to our national prosperity. The activity which prevails in shipbuilding has largely been the salvation of the iron and steel industries during the last two years, and the same happy situation is likely to keep our iron and steel works fully occupied for the whole of the current year.

One of the most satisfactory features of the present boom in shipbuilding is the large amount of work that is being done for foreign nations. We have now on hand about 265,000 tons of new shipping for foreign countries, and 920,976 tons for the United Kingdom, so that about 22 per cent of the whole is being constructed for other nations, most of which are themselves engaged in the shipbuilding industry. Our best customer at this moment is Japan, for which we have under construction 40,000 tons; and the next best is Russia, for which we are building 33,276 tons. And, despite all that we have lately heard of the superior facilities for shipbuilding in countries like Norway, Holland and Germany, we have a good deal of work on hand for all three countries. So long as Great Britain can so well hold her own in an industry that is so largely dependent on superior skill, knowledge, and craftsmanship, and so little dependent on special natural endowments, we need not feel very nervous about the possible loss of our national prestige as a manufacturing people.—[London Iron and Coal Trades Review.

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The board of bureau chiefs having in hand the plans for the three new battleships authorized by the naval appropriation bill, has sent out circulars inviting bids from shipbuilders. The vessels will be, in the main, very similar to the battleship Illinois, now building at Newport News. They will be of about 12,500 tons displacement, 75 feet beam, 23½ feet deep, 16 knots speed, will be covered with heavy armor and armed with 13 and 6-inch guns, in addition to numerous secondary batteries.

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The offices of the Lake Superior Consolidated Iron Mines, heretofore at No. 1 Broadway, have been removed to No. 26 Broadway, 15th floor.

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An exhibition of American machinery has just been opened at Lima, Peru, with the purpose of broadening the American market in that country.

## EARLY WIRE ROPEWAYS.

The introduction of the overhead wire rope system of transport is due to Mr. Charles Hodgson, who, in 1868, obtained the original patent referring to this means of conveyance. It has, indeed, been claimed that a ropeway was in use at Dantzic, Germany, in the year 1696; but as steel wire ropes do not appear to have been invented before the year 1837 this ropeway, about which much mystery exists, must have been worked with hemp rope, and therefore cannot come under the category of wire ropeways. Indeed, so little is known concerning it, that it is perhaps best to ignore it and assume that, to all practical purposes, wire ropeways were introduced by Mr. Hodgson in 1868.

With much prescience, his original patents seemed to cover the principle of nearly all that has been done since in the matter. Where he obtained his first idea of utilizing moving ropes for the transportation of loads is not quite clear; but the writer, who was associated with him in the design of ropeways almost from the date of their invention, in a conversation many years ago learned from him that the sight of Hirn's transmission of power by ropes, as exhibited at the Paris Exhibition of 1867, first suggested to him the possibility of slinging loads from the rope and transporting them.

The late Mr. T. Smith also informed the writer that a crude description of ropeway was seen by him many years before the original patents were taken out; but it appears to have been a very primitive and home-made type, inasmuch as it consisted in the tying of bags, containing the workmen's luncheon or dinner, to a traveling rope which was employed for the purpose of hauling barges through one of those large tunnels which occur on British canals. This, therefore, though certainly a type of wire ropeway for the transport of material, cannot be regarded as a serious anticipation of Hodgson's invention.

The first line constructed under the original patent was an experimental one near Leicester, England, for the carriage of grapite, and, as usual in the early youth of mechanical invention, many difficulties had to be surmounted and many problems solved. Probably the remark attributed to George Stephenson's first railway is applicable to this line when, in reply to inquiries of observers as to how the work was getting on, the reply was made that the line "did not get on, it was continually getting off."

This certainly was the case with the rope employed on this ropeway. Nevertheless, to a certain extent, it proved, in the end, a moderately efficient means of transport, and had it not been for the great difficulties which were encountered in dealing with the landowners over whose land the line passed, it is probable that a more permanent and important line would have been erected which would have been at work to the present day.—[W. T. H. Carrington, in Cassier's Magazine for May.

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### The Tropenas Steel Process.

We understand that at the Woolwich Arsenal the Tropenas steel manufacturing process has now entirely superseded the open-hearth for the manufacture of shells and castings for gun-carriages, etc. At the Arsenal there are now several two-ton Tropenas furnaces at work, with results which are stated to be entirely satisfactory. The main advantage of this process is that it gives a higher temperature than is customary with any other. The process is being worked at Sheffield by Messrs. Edgar Allen & Co. At Woolwich it is claimed that much better results are being realized than were customary with the open hearth. Messrs. Edgar Allen & Co. are the only firm in this country that have a license for the process, but 15 plants are being worked in other countries, and the process is now being employed in the United States.—[London Iron and Coal Trades Review.

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Since the Wilshire Bldg. fire in December, 1897, the offices of Burwell & Briggs, of Cleveland, general agents of the Hartford Steam Boiler Inspection & Insurance Co., have been in the Mercantile Bank Bldg. The firm is now moving, however, into permanent quarters, Rooms 32 and 33, Clark Bldg., 208 Superior st.

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The rebuilt Anniston, Ala., pipe works started up last week. The plant is considerably larger than before the fire.

# HOW TO SECURE UNIFORMITY IN PIG IRON ANALYSES.

The analyses of pig iron recently made by representative iron chemists, at the request of Thos. D. West, and reported in Mr. West's paper before the Pittsburg Foundrymen's Association, have aroused much interest among furnacemen, founders and iron analysts. Many letters have been received by Secretary Zimmers, of the Pittsburg Foundrymen's Association, and by Mr. West, commending the proposal for an arrangement by which standard drillings of iron can be secured by furnace chemists and others for checking purposes. The letters in some cases go generally into the considerations suggested by Mr. West's paper, covering the broad question of the causes of variations in pig iron. We give extracts below from a number of these letters, reserving others for another issue:

F. E. BACHMAN, BUFFALO FURNACE CO., BUFFALO, N. Y.

I thoroughly agree with Mr. West regarding the desirability of having a standard sample of cast iron from which we can draw when wanted. Regarding standard methods, there is a question, for the reason that absolute accuracy requires time and excessive labor. The results published by Mr. West are not results for chemists to be ashamed of by any means. The sulphur, phosphorus and manganese are the closest I have seen. The silicons vary more than they should in Tables 1 and 2. Of the carbons I will speak later. * * * Referring to the work of this laboratory: In making these analyses there was not one method used that we consider absolutely reliable without greater refinement, and on sulphur, phosphorus and manganese we would use entirely different methods if absolute accuracy were required. But in that case it would take three days to complete the work. I wonder if the foundrymen of the country would pay us the additional cost this would entail. My experience is that they are not willing to pay one cent more for Buffalo iron with silicon within one-fourth of one per cent of given analysis than they are for some irons coming from the valley district which I have known to have 1.75 per cent less silicon than represented. As to silicons, the results are not so bad as Mr. West seems to think. Every sample contained sand; possibly some of the sand had iron attached to it and got into the higher results. Probably some of the laboratories got their samples in good shape and did not go over this sample more than once to get it out. And then what difference will .27 per cent silicon make in a foundry iron where every bed has a variation, and there may be over 1 per cent variation in a cast and not one cast in ten has a less variation between the highest and lowest silicons reported. The sulphur, phosphorus, and manganese, with one or two exceptions, are all that could be expected, but we need a uniform sulphur standard and a more reliable sulphur method which can be worked accurately in not to exceed 30 minutes. A method which requires longer than that will be of no value. But even if this method is not obtainable, a standard which will retain the smallest possible amount of sulphur in the insoluble residue and dissolve easily will be a godsend to iron chemists. Regarding the carbon determinations there is little to say. The results are abominable. I wonder whose fault it is. Judging from the sample received by us, not all the chemists'. You would as well expect two chemists to agree on the iron in a sample of ore which had been passed through a one-inch mesh sieve as in a sample part of which lies on a 20 and passes an 80 mesh sieve. I venture to say not one laboratory in 10 is prepared to make accurate carbons.

There is, therefore, a big opening here for a reliable standard and for a method applicable to furnace and foundry practice. Great care will be necessary in the preparation of this sample, to be sure there is no segregation. Pig iron would not do, as there are no two spots in the pig which are the same, and where you are dealing with 3.75 per cent to 4 per cent of a material which separates mechanically it is hard to get a mixture which is uniform and stays uniform where specific gravities vary. Not very long since we had occasion to check seven chemists on ferro-silicon and obtained results which we consider show careful, accurate work, viz.: Silicon, No. 1, 13.52 per cent; No. 2, 13.45 per cent; No. 3, 13.17 per cent; No. 4, 13.44 per cent; No. 5, 13.59 per cent; No. 6, 13.58 per cent; No. 7, 13.05 per cent.

F. SCHUMANN, PHILADELPHIA.

I have read Mr. West's paper with interest and fully concur with him as to the desirability and need of some uniform method of analysis. I am aware that chemists and metallurgists are fully alive to these needs as evidenced by the activity of both national and international committees. Any one can realize the difficulties which lie in the way of the prompt adoption of uniform methods when he considers the great diversity of opinion that prevails even in so simple a question as the proper form of samples for physical tests. Mr. West's paper is most pertinent and opportune, coming as it does from one who has experienced the necessity of more uniform methods for direct application to the foundry business.

A. M. ROBBINS, CLEVELAND.

A "central standardizing laboratory" no doubt is much to be desired if it can be operated in a perfectly reliable manner. I am not sure but a monthly exchange of tests among a dozen operating chemists would accomplish the desired end. I realize the necessity of correct analytical work and would be glad to see measures taken to bring about a method of procuring such a result.

JOHN M. M'CANDLESS, ATLANTA, GA.

I surmise that the object is to encourage an association of iron chemists so as to obtain uniformity of analytical results by adopting uniformity of methods. I can only say that this plan has worked well with the fertilizer chemists. Before the organization of the association of Official Agricultural Chemists, the discrepancies between the results of different chemists on the same sample were something startling. But since the adoption of uniform methods for estimating the "soluble reverted and insoluble" phosphoric acid, also the nitrogen and potash in commercial fertilizers, these discrepancies have to a very great extent disappeared, and there is no reason for differences on the same sample, and will be none, where the methods prescribed are faithfully carried out. In my belief, more variations are due to the use by chemists of certain "short cut" methods to the exclusion of the standard and well tried methods, than to any other one cause.

A. E. OUTERBRIDGE, JR., PHILADELPHIA.

Mr. West's suggestions are good; at the same time I must say that I have thought that discrepancies such as he refers to, have been due to irregular sampling rather than to imperfect chemical manipulation. Some furnace proprietors observe more care in shipping iron corresponding to the analysis furnishd with the invoice than others. In such cases I have often been surprised at the close agreement between the furnace analyses and "check" assays. In several cases that have occurred in the course of years where discrepancies have been sufficient to cause inquiry or complaint, investigations made at the furnaces have resulted invariably, in my experience, in explaining the matter on grounds other than that of fault in the analyses.

O. T. STANTIAL, CHICAGO.

I have read over carefully and with much interest the article by Mr. Thos. D. West, in *The Iron Trade Review*, of April 14, 1898, entitled "Need of Greater Uniformity in Pig Iron Analyses." Having had quite a number of years experience as chemist in laboratories of iron and steel works, I have oftentimes experienced the difficulties that Mr. West refers to, in obtaining correct check analyses by different chemists. The idea of establishing a central standardizing laboratory for the purpose of furnishing standardized drillings of cast iron, is, I believe, a move in the right direction, but I do not believe that it goes far enough to be of much practical benefit, except as a beginning to obtain more uniform results. In my opinion, a laboratory of this kind should not only furnish standardized drillings, but should furnish uniform methods of analyses and also standardized solutions and reagents and standardized materials.

The three tables of comparative analyses in Mr. West's article show such variation in each element that it would lead one to think some such scheme as Mr. West proposes should be adopted. Where such varied results are obtained by such able chemists as are the majority of those that made these analyses, it is not to be wondered at that no uniform results can be obtained by the average chemist.

Although not at present actively engaged in chemical work, I depend greatly upon chemical analyses in running mixtures of both gray and malleable iron and I believe it would be a great advantage to the iron industry to be able to obtain uniform analyses and results that can be entirely depended upon as correct, instead of the uncertain results that we occasionally meet with in general chemical work.

ASA W. WHITNEY, PHILADELPHIA.

I heartily approve of the suggestions made in Mr. West's paper. Of course there is much less demand for accuracy in

some classes of work than in others; but until results check better than at present much doubt will exist as to where the error lies. But it will be found, after the most accurate agreement of methods is reached, that the one needful point is to know why a far greater variation is allowable in a well graded iron of one class than of another. I find that an accurate analysis is desirable in any sample and that it as truly represents the lot as another accurate analysis of another fair sample, though the differences in the figures frequently exceed the differences due to methods, as shown in Mr. West's interesting paper. For instance, to bring grading by analysis to a practical degree of accuracy for all classes of cast iron, while the maximum accuracy of method in the laboratory is always desirable, the almost certain difference in samples of really well graded iron must be understood by buyers. And they should understand it to some such degree as it is understood by those who by careful figuring of mixtures can keep the same grade of output in any line of castings up to specifications far more rigid than pig iron grading and yet intentionally make greater changes in their chemical composition of cupola charge and of casting than are to be found between most samples of well graded pig iron. Only by means of full analyses and careful, though simple, tests can this essential point be proved to foundrymen: That mixtures are more economically as well as more successfully managed without ocular inspection of pig metal than with it, if the real meaning of even a rough full analyses is known and its equivalent compostitions are known.

GUY R. JOHNSON, EMBREVILLE, TENN.

I highly approve of your proposition to establish a laboratory which will furnish standard drillings, but speaking from a chemical standpoint, I don't think that you go far enough. You may not be aware of the fact, but chemists are, that different quantities of elements for pig iron require different standards. The theoretical standard will not work out. For this reason, if such a laboratory was established, and by the way, such a laboratory would be a very profitable undertaking, in all probability, it would have to be prepared to furnish charcoal iron drillings for the charcoal iron furnaces, Bessemer iron drillings forthe Bessemer furnaces, ordinary foundry iron drillings for furnaces making ordinary foundry iron, with phosphorus running from .50 to .75, etc. This, of course, would complicate the work considerably, but as every chemist with a practical knowledge of pig iron analyses will tell you, it is absolutely necessary.

This brings me to my one criticism on the plan proposed for getting the drillings. As you are well aware, ordinary foundry iron runs below .02 in sulphur (I am speaking now of Nos. 1 and 2). Your drillings having been passed through the cupola will have considerable more sulphur, probably up to .05 or .06, and this in itself would preclude the use of such drillings as you propose using, for standardizing solutions for sulphur analysis.

In regard to the difference in results: I beg to call your attention to one fact, which you have evidently missed, and that is, that the samples sent out to the various chemists contained, in at least two cases, both silica and scale. Making our analyses, we use a magnet, in the first place, and then methods for actual analysis, which would allow for the free silica. You can very readily see that either the presence of either silica or scale, or both, would have a material effect on the resultant silicon analyses, and, indeed, this remark will apply to both phosphorus and manganese.

ALBERT LADD COLBY, SOUTH BETHLEHEM, PA.

In this week's *Iron Age* you will find a critical review of this paper in which I have proven that Mr. West's samples were not uniform, so that the discrepancies in the different chemists' analyses cannot logically be used by him as an argument in support of his plan to establish and "maintain a central standardizing laboratory." I also state that the publication of such comparisons is unfair to chemists, especially when his avowed object was to compare the accuracy of analytical methods, and that such comparisons will only serve to unnecessarily prejudice foundrymen against chemistry. I cite an instance of greater difference in composition than his table of analyses show, occurring in the same cast of iron, and claim that non-representative and uniform methods of sampling have been the cause of much of the prejudice which has retarded the adoption of analytical chemistry as a basis of foundry mixture. I appeal to the furnacemen and particularly to the foundryman who is the purchaser and hence has the key of the situation in his hands to first institute reforms in methods of sampling at furnace and then by demanding check analyses rid the profession of careless workmen who can never be made into chemists by either standardized drillings or standard methods of analyses.

Although this proves clearly that Mr. West's suggestion will not entirely remove the cause of error which now retards the more general adoption of analytical chemistry, I am too keenly alive to chemists' own shortcomings to adversely criticise any practical suggestion tending to aid the chemist in the improving of his analytical methods; and I heartily endorse Mr. West's suggestion of a cheap and convenient supply of standardized cast iron drillings or turnings, and think that the Pittsburg Foundrymen's Association might very properly appoint a committee to carry this idea up to the National or American Association, who would do well to set aside an appropriation of the careful preparation and analyses of such samples.

I do not endorse his idea of establishing and "maintaining a central standardizing laboratory." Such an expense is unnecessary, as the work can be taken up as an adjunct at some laboratory where it will receive careful supervision, and where chemists can buy the standardized samples. Six analyses should be made on each sample. If desirable, one set of analyses may be made at this laboratory, but at least two should be made by American members of the International Committee on Standard Methods of Iron and Steel Analyses, and the remainder by laboratories connected with prominent iron and steel works.

R. S. MAC PHERRAN, MILWAUKEE, WIS.

There have been a great many analyses tables published, some showing greater variations in sulphur and phosphorus than those of Mr. West, but none I have seen where the differences were so great in carbon. Could not this have been due, in part, at least, to the condition of the sample? It would be difficult to so mix a large quantity of drillings as to give each sample its proper proportion of graphite. In the event of future samples being prepared, pardon my suggesting that what is called a "shot sample" of cupola metal be taken, pounded up and put through a 100-mesh sieve. The carbon will be nearly all combined, the material finely divided and more uniform samples obtained. As to the uncertainty of one laboratory checking the results from another, this may be regarded by a practical foundryman with a laboratory at his disposal from two standpoints: 1. As it affects his buying iron; 2. As it affects his using it. There is always more or less friction between buyer and seller and a series of standards such as suggested, would be of great value in disputed cases. It would also lessen the number of disputes, by making more uniform the results from different laboratories.

In using the iron, the ordinary "variations" of a chemist, if consistent, do not seriously affect the value of his analyses when applied to making mixtures. For example: Castings show a certain loss or gain in the various elements, as compared with the pig iron charged. The results of two men, both the castings and pig iron being analyzed by each, should show the same loss or gain. For the methods used and the personal factors will apply to the results on both the castings and pig iron. The ratio of the analyses should be the same. For use, though absoluteness of results should be and is the object of all chemists, consistency is nearly as important. I do not wish to be understood as upholding careless and inaccurate work, but merely to express the belief that when ordinary care and methods are used, the determinations obtained, while perhaps not absolutley correct, will give satisfactory and recurrent results when applied to cupola practice.

S. S. KNIGHT, SPRINGFIELD, O.

The plan Mr. West sets forth seems to me to be one of great practicability and merit and undoubtedly would do much toward securing more uniform results in the analysis of cast iron. It seems impossible, however, that this end could be fully attained without the adoption of some standard method of procedure for each and every determination. I would respectfully suggest, therefore, that the association, if it should see the matter in the same light, consider the advisabliity of appointing a committee to investigate thoroughly as to the probable utility of such standardizing and the adoption of such standard methods as may seem to them to be best.

JAMES C. FOSTER, SHEFFIELD, ALA.

I heartily co-operate with Mr. West in his work and think it a step well taken. When checked by other chemists and considerable variance found, which is often the case, it is a poor explanation, gives little satisfaction and is rather embarrassing to the chemist to say that he uses a different method. This plan should give us a check against something difinite and therefore add greatly to the uniformity of the results.

## THE PRIDMORE MOLDING MACHINE.

The invention of the Pridmore molding machine dates from the connection of the designer with the inventing and pattern department of the McCormick Harvesting Machine Co., of Chicago. The original installation in these works included air pressure machines, with elevators for supplying the machines with sand, cranes for bringing flasks to the machines and carrying away molds, and sand conveyors and power riddles for carrying the sand from the floor to the bins and working it over for use. The study of this system, which was in use for two years, resulted in the simple and comparatively inexpensive apparatus known as the Pridmore molding machine. It is stated concerning the foundry operations in the McCormick works that they are carried on by ordinary laborers and that the average cost is 73 per cent less than the usual method of hand molding. On an average melt of 140 tons a day there has been a loss of less than 3 per cent from poor castings.

The Pridmore machines are of the type which draws the pattern through a plate. The ramming is by hand. The construction is simple and substantial. A frame stands on the floor, carrying the stripping plate. A yoke works vertically in the frame, carrying the patterns and a crank with a connecting rod for raising and drawing down the yoke with the pattern. Adjustments are provided for shortening or lengthening the draw, for raising or lowering the patterns relative to the stripping plate and for taking up wear or the ways. All wearing parts are brass bushed. That the patterns shall draw true is insured by the long vertical distance between the ways and the center guide in the base of the machine. There is no rapping. In raising the patterns the crank is thrown just enough beyond the vertical to lock the patterns securely in position for molding without any additional locking mechanism.

The Pridmore machine is now manufactured in 10 different styles and over 100 sizes, adapted to a wide range of classes and sizes of such castings as are duplicated to a large extent. Some of these styles are shown in the illustrations. Fig. 1 represents a round stand machine, with two ways, single crank and center guide. It is 28½ inches high and the draw is 4⅝ inches. There are 10-inch, 12-inch, 14-inch, 16-inch and 18-inch machines, these representing the diameters of largest patterns that will draw down into the frames of the respective machines. Fig. 2 shows a three-way, center-guide machine of the round combination stand-and-pit type. The sizes are 20, 22, 24, 26 and 28 inches. By placing a round hollow stand in the floor this machine can be lowered 8 inches and used stationary or movable from stand to stand where there is a series of the latter.

The square stand machines are shown in Figs. 3, 4 and 5. Figs. 3 and 4 represent the two-way, single-crank center guide machine. These are made in seven sizes. The ends of the frames in the square-stand type are left open, this construction permitting the use of patterns longer than the frames. In Fig. 5 is seen the four-way, double-crank machine with end guides. These machines where wider than 20 inches, are built with four cranks, and where longer than 48 inches with six ways. They will mold very large patterns.

The manufacturer and inventor is Henry E. Pridmore, 111-113 West Harrison st., Chicago.

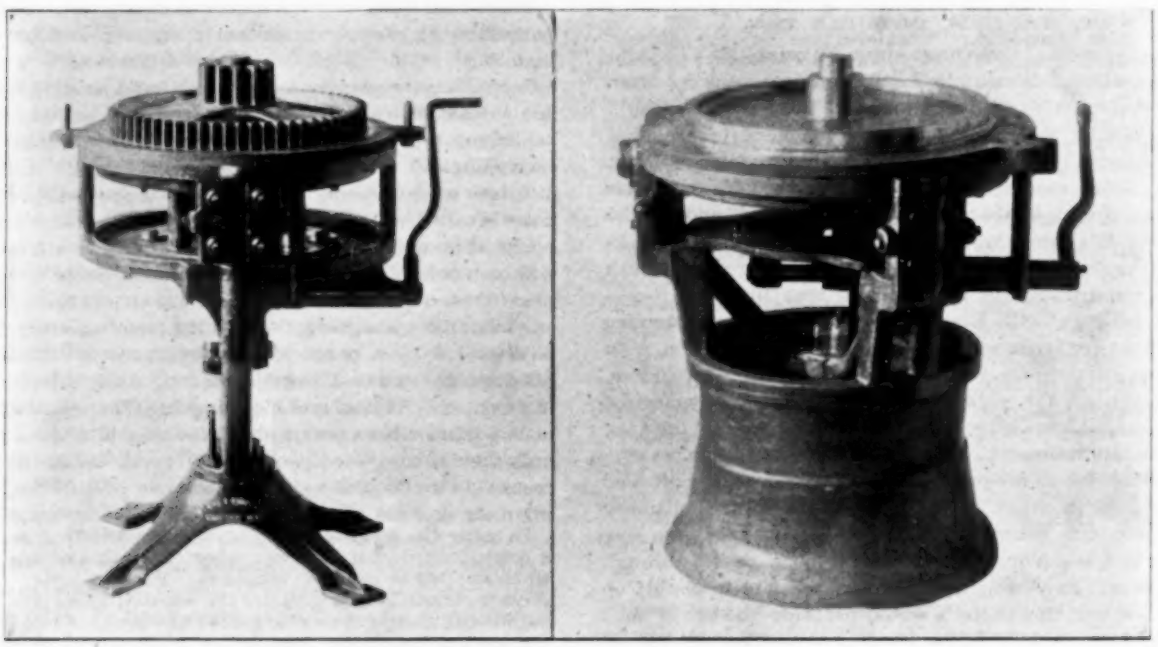

FIG. 1. THE PRIDMORE MOLDING MACHINE. FIG. 2.

## STANDARDIZED DRILLINGS FOR IRON ANALYSIS.

TO THE EDITOR:

In view of the letters recently written by chemists and metallurgists concerning a central laboratory for furnishing standard drillings for iron analyses, permit me to add a few lines to my original paper on this subject. Some seem to think I should have sent out specially prepared drillings, such as were referred to as essential for standardizing purposes. Such a course would not have demonstrated the results of actual practice. When a founder or furnaceman desires to check pig iron analyses, he does not have uniform and clean drillings with which to do it. He is compelled to use such as he may procure from the pig metal as it comes to his yard. All pig drillings are liable to contain some sand or grit, which, as a rule, is taken out of the account by the use of the magnet before analysis. And again, no attention is paid to uniformity in the size of drillings. In order to conform with this general practice I sent the drillings out with a request to remove any sand that might be found. It has been claimed that the difference in results shown in the paper was not due to non-uniformity of methods, but to the drillings having sand in them. As indicating whether there are grounds for such claims, let me call attention to the fact that where a chemist is low in silicon with one class of iron, he is as a rule, low or not far off in the other two, or vice versa. As an example of such checking, see Laboratories A and P, the first and last of the three tables shown.

It was partly to show how methods check one against another that drillings were given of the three different classes of iron shown and I believe a study of this feature of the paper will lessen the stress some have put on the method of sampling the pig drillings as the cause of the variations shown.

Moreover, I hold descriptions of methods used that explain in themselves the differences in the results. Dr. Moldenke has noted these methods which, in connection with his own extended experience and study of the tables, led him to take the position, in the last issue of *The Iron Trade Review*, that the variations shown in Tables 1, 2 and 3 were largely due to the methods used.

I think it is fair to conclude that the analyses given in the paper read at Pittsburg indicate what a founder may expect, who, having worked after one chemist's method in making his mixtures, is brought under the different method of another chemist. The paper shows that such a change might be very injurious to the trade of both furnaceman and founder. Some are of the opinion that the paper does not go far enough. It is true, much more might have been suggested, but it was thought best to start on a small scale, as such a course would make success the surer in developing larger fields of work. If anything had been said directly about working for uniform methods in analysis, the paper would have been criticized as assuming to deal with what belongs to the chemists themselves. I believe that establishing an agency for furnishing clean, uniform standardized drillings at moderate cost, will do more to bring about uniform methods than any other one thing that could be suggested, and I am pleased to note the great interest all manifest in the attainment of this end. I am also pleased with the action of the Pittsburg Foundrymen's Association in appointing a committee to carry this work up to the American Foundrymen's Association convention which meets in Cincinnati, June 8-10, when it is hoped the project will meet with such encouragement that we shall soon see such a central standardizing agency in operation.

THOS. D. WEST.

Sharpsville, Pa., May 1, 1898.

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As a result of Major Malcolm McDowell's visit to the Pacific coast, the Wolff & Zwicker Iron Works, of Portland, Ore., have adopted the use of McDowell semi-steel in Government and other high class work. The Portland company has contracted for the exclusive right to the McDowell process for the States of Washington and Oregon. The Wolff & Zwicker Iron Works covers an area of 300 by 600 feet, and consists of fully equipped machine shops, foundry, blacksmith, pipe, boiler and pattern shops, a shipyard and warehouse. It is one of the largest plants on the Pacific Coast. The company builds iron and steel ships, marine and mining machinery, engines and boilers, steel-riveted pipe, tanks, bridges, vault and other structural work. The company has just completed two light ships for the U. S. Government, and is now building one 30-knot and one 22½-knot torpedo boat for the Government. It has also several other large contracts in process of construction. The McDowell semi-steel process is controlled by Hanson McDowell, 1522 Monadnock Block, Chicago.

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THE secretary, Bennett H. Brough, announces the annual meeting of the Iron and Steel Institute, which will be held at the Institution of Civil Engineers, Great George st., Westminster, London, May 5 and 6. The list of papers follows: "The Iron Industry of the Urals," by H. Bauerman, Professor of Metallurgy, Royal Artillery College; "Lime and Limestone in Blast Furnace Practice," by Charles Cochrane; "Coking in By-Product Ovens," by John H. Darby; "The Use of Blast Furnace Gases as Motive Power," by Adolphe Greiner, Seraing, Belgium; "The Solution Theory of Iron," by Baron Hanns Jüptner von Jonstorff, Leoben, Austria; "Steel Permanent Way," by R. Price-Williams; "Brittleness in Soft Steel," by C. H. Ridsdale; "Allotropic Iron and Carbon," by E. H. Saniter; "The Crystalline Structure of Iron," by J. E. Stead; "Steel Forgings and Forging Tools," by F. Radcliffe, Woolwich.

## A PLAN FOR STRENGTHENING THE NAVY.

TO THE EDITOR:

"The sudden culmination of the difficulties with Spain in the present state of war has at least found our small navy prepared to cope with the fleets of that country. That our coast towns have not yet been laid under contribution, and our harbors blockaded, is not due to the foresight of our legislators, for they allowed the efficiency of our navy at the close of the civil war to go downward for too long a period to recover quickly enough in the face of threatened danger. The fact alone that Spain is a second-rate power, and her friends—for the under dog always has sympathy—are themselves hesitating to arouse the latent fighting qualities of this nation, accounts for the comparative equanimity with which we can await the termination of this contretemps in the peaceful evolution of our national existence.

The change which has come about in our domestic economy is causing us to wage an aggressive war for our share, and a little more, of the world's markets, and it may be only a question of time when we must face a first-rate European power, or worse yet, a combination of two or more of them. To do this effectually we must have a navy many times larger than our present very effective body of ships.

The writer remembers, while connected with the United States Coast and Geodetic Survey, witnessing the official reception at the Brooklyn Navy Yard, of the late Queen Kapiolani. The Atlanta had been just put into commission and her majesty was shown how quickly the great guns could be handled. Close alongside was the Boston, her powerful propeller churning the water incident to the breaking in of her machinery, the vessel being secured to the dock. The large, dark hull of the Chicago, as she was launched, loomed up prophetic of the monsters of marine architecture still to come. This was the nucleus of our present navy. Side by side with it were the old iron clads, the Miantonomah before she was rebuilt, the old wooden man-of-war Nipsic, which sailed a few days later to meet her doom in that tragic night at Apia, and a few other dismantled giants of other days.

Our present squadrons are truly a remarkable showing for the eleven years which have passed since then, but still greater efforts are necessary, and these in the very near future. I must heartily commend the patriotic idea, to my knowledge, first brought forward and warmly advocated by Mr. Jos. S. Seaman, of Pittsburg, that each State, according to its means, have built and fully equipped a battleship or smaller war vessel, and present it to the nation. Thus the great States of New York, Pennsylvania and Ohio could easily furnish a first-class battleship, while the poorer States would donate simply torpedo boats. When one contemplates the fact that three years would thus give us nearly four dozen extra fighting vessels, besides those authorized by the general Government, and this without being a serious burden to any State, the idea is certainly worth discussing seriously.

Now in connection with Mr. Carnegie's recent letter to *The Iron Trade Review* in which he advocates the establishment of a great shipyard in New York City: I can suggest nothing better than that the great Empire State put this idea into tangible shape by offering a contract for a great battleship, designed by the Navy Department, and let at its estimated figure to a responsible corporation willing to undertake this important venture.

This would not be altogether a subsidy, and yet would certainly be the means of establishing a magnificent enterprise which in the hands of the right men will redound to the glory of the Empire City and the shipping industry of the country at large. RICHARD MOLDENKE.

Pittsburg, Pa., May 1, 1898.

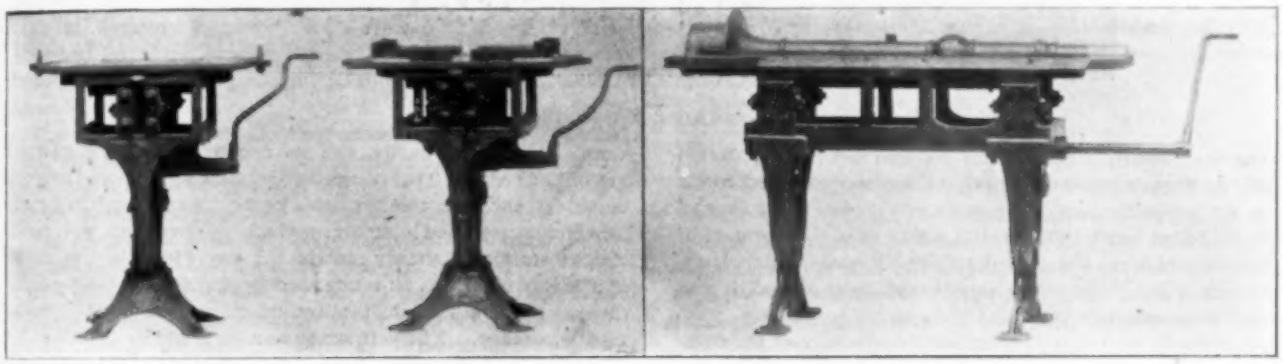


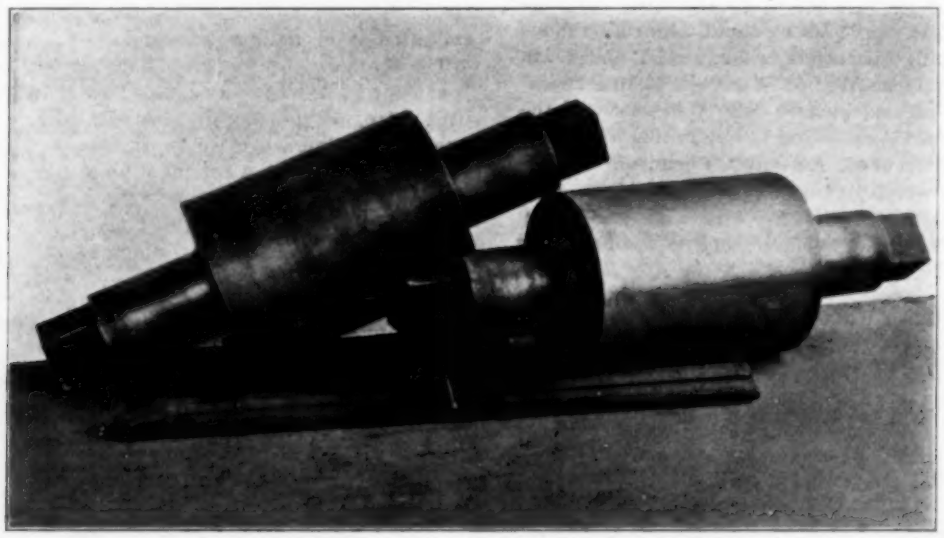
FIG. 3. FIG. 4. FIG. 5.

THE PRIDMORE MOLDING MACHINE.

## PYRO-CALCIC HARDENING.

The pyro-calcic hardening method practiced by Messrs. Loring Coes & Co., Worcester, Mass., is to be credited with having done some very nice work.

The illustration shows a pair of rolls as they appeared 36 hours after being hardened by this process. They are made of a brand of Crescent steel and were hardened for Mr. Edward N. Cook, Providence, R. I. As will be seen, the necks are rather small in proportion to the face, and the rounded corners at the points of juncture are hardly large enough to add protection to these danger points in the hardening process. The rolls were hardened all over and not a scale was started anywhere. As to the depth of hardening obtained by this process, the Messrs. Coes inform us that they had occasion recently to break a worn-out die that they had hardened, made of 2½ x 2 x 7-inch steel (design on 2 x 7 face), and it was found to be so hard that it could not be filed for about ⅛ of an inch inward, while the grain hardness showed ⅞ inch deep, and in one place, where key tapers had been planed, it was changed clear through.



PYRO-CALCIC HARDENING.

They state further that it is impossible, by any of the ordinary processes, to change the grain to this depth, and that for any person to claim to harden clear through any piece over one inch diameter is preposterous. They consider that a mere change of structure should not be called hardening. When they say "hard" they mean that the broken edge of a three-cornered file will not touch the piece.—[Sparks from the Crescent Anvil.

## THE HERMANN TIME DETECTOR.

The Hermann Time Detector Co., of Youngstown, O., is equipping a large number of industrial establishments with its system of watchman's time detector, which has proved very successful. The device is purely mechanical and does away entirely with complications and annoyance. It is a simple and effective protection against the machinations of dishonest watchmen. It is so constructed and a special attachment so adjusted, that it is impossible for a watchman to defeat the intention of the machine. The record at a given station cannot be made without the visit of a watchman at the recording moment, thus affording complete protection. The machine is constructed in three different forms: One is arranged for the use of a seven-day dial, and on this is recorded the visit of a watchman at any station for a full week. Another form is for a one-day dial, on which the record of each day is kept separately. The third form is a police clock, intended for use in the police service of larger towns and the smaller cities, and is well adapted for this purpose. The simplicity of this invention considered in connection with its entire reliability, argues for its very general adoption among all classes of manufacturing and mercantile institutions.

A feature of special interest to industries desiring but a limited number of stations, is the low price at which these machines can be installed, thus placing protection of this character within the reach of the many who heretofore have not been able to avail themselves of its advantages. Insurance companies are making concessions in rates where these detectors are in use, and in this way the entire cost of a system of detectors is covered in a short time.

The Hermann machine is enclosed in a case made of cast iron, finished in black Japan. In the door is a round opening into which is set a glass, thus exposing the dial to inspection at any time. The front edges of this cast box are grooved and in this groove is secured a rubber strip. The door closing depresses this rubber and the case is made proof against dust and moisture. Inside the case is set a special eight-day clock movement and with this movement the dial is rotated. Within the same case underneath the clock movement is a simple mechanical device and so constructed that it can not get out of order. This device is operated with a key from the outside of the case, the key holes being covered by a key plate to which is attached a small padlock. When the watchman visits a station he simply inserts his key opposite the name of the day on which he is registering and this forces a needle through the dial thus accurately indicating the exact time the visit was made. The watchman can not get to the dial for the purpose of making his record in any other than the prescribed method. If he should make a duplicate key and unlock the case door, the moment he turns the key the patented safety attachment co-acts with it and punctures the dial and would thus expose any attempt to remove the dial for a dishonest purpose.

U. S. Consul Lyon, writing from Hioga, under date of March 19, in regard to American locomotives in Japan, says: "The Kobe *Chronicle*, an English journal, copied from a vernacular newspaper the statement that the locomotive department at Shimbashi station (Tokyo), considers that American locomotives are superior in all respects to those made in England, and work more economically. The American locomotive makers have been quite active in contesting this field, and such experiences as the above should stimulate them to still greater effort."

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# INDUSTRIAL SUMMARY.

**New Buyers in the Market, and Some of Their Wants:—**

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The Ashland Steel Co., of Ashland, Ky., which is making arrangements for the construction of a rod mill and wire drawing plant, is making inquiries for equipment, including draw benches and wire machinery.

The Coleman Mfg. Co., Concord, N. C., asks bids on boilers and engines.

D. M. Stratton, secretary of the Atlantic & North Carolina Railroad Co., New Berne, N. C., asks proposals on 100 to 200 tons of 50-pound steel rails and 30 to 50 logging cars, new or second-hand.

The Best Wire Fence Co., organized recently at Windsor, Ont., has let the building of its fence-making tools on contract, but it is the expectation to erect a building in the near future, so that the company can manufacture for itself.

The Enterprise Machine Co., composed of Messrs. Bowen and Donnell will start a machine shop at Niles, O.

The Pitney Shutter Worker Co., at Quincy, Ill., has leased a machine shop to manufacture its own devices. The probable addition of a molding department is mentioned by a local paper.

The Horne-Berger Gas Engine Co., Dayton, O., has been incorporated with $25,000 capital.

The Dresden Iron & Steel Sheet Co., the new sheet mill enterprise for Dresden, O., has been incorporated with $100,000 capital.

At Oronogo, Mo., the Oronogo Foundry is about completed and equipment is being installed.

At Rapid City, S. Dakota, Homer Charles is negotiating for the purchase of the local foundry and will manufacture mining pumps and brass castings.

At East St. Louis, President Renshaw of the Winstanley Park Co., is furthering a project for the establishment of a wire and nail mill. It is said 60 men will be given employment. Excavation has begun, Wm. Weimer, of Belleville, Ill., having the contract.

The Columbia Stoker Co., of Holyoke, Mass., has been incorporated, with capital of $100,000. The officers are J. W. Cumnock, president, and J. C. Keough, treasurer.

The Willmar Gasoline Engine Co. incorporated at Minneapolis, Minn., with capital of $20,000. Ex-Lieut. Gov. A. E. Rice is one of the incorporators. The company will build a plant at Willmar.

At New Decatur, Ala., A. G. Schellenberger, of Bloomington, Ill., has made a proposition to the Commercial Club for the establishment of a plant for the manufacture of brassware, to employ 500 hands.

**New Construction:—**

A. L. Pitkin, of Brooklyn, N. Y., is interested in a stove manufacturing plant about to be located at Butler, Pa.

The Government of Ecuador is asking for bids of the construction of an iron building to be used as a custom house for the port of Guayaquil. Payment for the work will be guaranteed by import duties of the port, appropriated for that purpose. The plans and specifications are in the hands of Miguel Valverde, consul-general of Ecuador, 24 State st., New York.

It is reported that the erection of the projected steel plant at Birdsboro, Pa., for the Schuylkill Valley Steel Co., has been postponed for the present.

At Brantford, Ont., Havill & Whitham have the contract for the new factory building of the Verity Plow Co., at $51,000.

An inspection of the new plant of the Johnstown (Pa.) Tin Plate Mfg. Co. has just been made by President J. W. Place, of New York, and other officers preparatory to starting up.

The project of building a Cleveland foundry for the Born

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Steel Range Co. will not be pushed for the present, but if the war is soon ended may be taken up.

For the A. W. Stevens Co.'s agricultural machinery plant at Marinette, Wis., offers of free land have been made by citizens and the city. Construction will begin at once. The company's factory at Auburn, N. Y., will be operated until Aug. 1.

**Additions, Enlargements, Removals, Etc.:—**

The Berlin Iron Bridge Co., of East Berlin, Conn., has just completed for the Conway Electric Street Railway Co., at Conway, Mass., a steel bridge to carry its electric line across the Deerfield River. The bridge is about 300 feet in length.

At Altoona, Pa., the machine shop and boiler department at the Pennsylvania Railroad shops will be increased to 323 ft. in length and 82 ft. in width. The improvements will be completed by Oct. 1.

Work has begun at Belvidere, Ill., on an addition to the National Sewing Machine Co.'s foundry. The building will be 180x60 feet.

The Filer & Stowell Co., Milwaukee, Wis., builder of Corliss engines and pumping machinery, has made important additions to its plant. An extension, 100x130 feet, has been built to the foundry, while the machine shop has also been enlarged 80x100 feet, and equipped with new machines. The capacity of the plant has thus been considerably increased. The company reports business very brisk in its line.

**Fires and Accidents:—**

The Bissell Chilled Plow Co., South Bend, Ind., suffered considerabe loss by fire April 22; fully insured.

Jenkins & Lingle, foundrymen, of Bellefonte, Pa., suffered a loss by fire April 21, estimated at $50,000, by the burning of a large pattern warehouse.

At Wilmington, Del., the machine shop of Delaware College burned. Loss, $18,000.

The loss to H. H. Tift by the destruction of his saw mills, machine shops and dry kilns at Tifton, Ga., by fire April 23, is $20,000.

**General Industrial Notes:—**

The Westinghouse Electric & Mfg. Co., through its Mexican representative, has been awarded the contract for supplying material for installing a complete power-transmission plant on the falls of the Monte Alto and Flainepantla rivers, in Mexico. The contract price, it is said, was $150,000.

The Lock Haven (Pa.) Nail Works, idle for the past two years, have been dismantled and the equipment sold for shipment to Philadelphia.

The annual meeting of the stockholders of the Joseph Dixon Crucible Co. was held at Jersey City, April 18, and out of a possible vote of 7,345 shares there were 7,042 shares voted for the re-election of the old board, consisting of Edward F. C. Young, John A. Walker, Daniel T. Hoag, Richard Butler, William Murray, Alexander T. McGill and Joseph D. Bedle. President E. F. C. Young, Vice-president and Treasurer John A. Walker, and Secretary George E. Long were re-elected.

New record has just been made at Reading, Pa., of a mortgage for $1,150,000 given by the Phoenix Iron Co., in 1873 to the Philadelphia Insurance & Safe Deposit Co.

At Huntington, Ind., F. W. Dorn, proprietor of the Huntington Foundry & Machine Works, has made an assignment. Assets, $8,000.

The Pullman Palace Car Co.'s plant has been running extra time for two months and has not had so many contracts on hand since the World's Fair. Nearly 5,000 men are at work.

The Middlesborough, Ky., stove foundry plant has been inspected by Louisville, Ky., parties with a view to starting it up.

The Chicago Rawhide Mfg. Co., 75 and 77 Ohio st., Chicago, manufacturer of rawhide belting and rawhide goods of all kinds, reports having had a very good business lately. Its sales since the first of the year have been larger than for any corresponding period for the past two years, and twice as large as they were last year during the same time. The foreign business of this company has been very heavy lately, and is increasing all the time. The inquiries in hand denote a continuance of a large trade.

A good example of dispatch in filling orders in war times is found in the fact that in nine days from receipt of order, the Lidgerwood Mfg. Co., New York, furnished ammunition hoists for the war ships Yosemite and Dixie, being fitted out at Newport News as auxiliary cruisers. The order consisted of 10 complete hoists, comprising double cylinder engines, cages, guides, sheaves and all the necessary paraphernalia.

The United States Projectile Co., of Brooklyn, N. Y., has just placed orders with the American Tool Works Co., Cincinnati, for a number of 22-inch and 24-inch lathes The American Tool Works Co. has also received through its office at Vienna, Austria, an order from the Oesterreichische Schuckertwerke for a number of boring mills, lathes, planers

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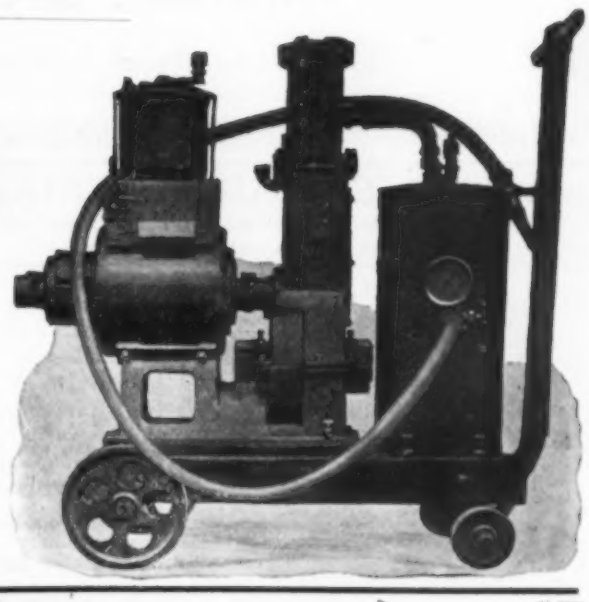

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908 Church street.
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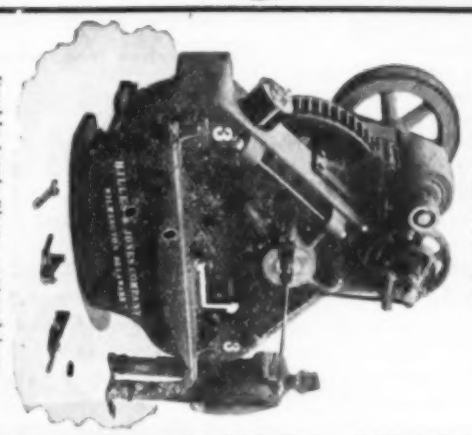
Double Angle Shear, motor driven.



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and drill presses. From its office at St. Petersburg, Russia, has come an order for a number of large lathes and planers from W. Pravlaniea Obshchestwah Istee-inskich Metallourgeetcheskichee Mechahneecheski Sahvodoff, one of the largest iron works in Russia.

The American system of rope transmission as furnished by the Rice Machinery Co., 166-174 South Clinton st., Chicago, is becoming more popular every year. Its efficiency as compared with belts or the old English system of rope driving, has done much to give it its present position. For perpendicular drives or for "getting around a corner" it is especially effective. Among the different firms which have lately equipped their plants with the above company's system of power transmission and machinery, are the following: Viles & Robbins, packers, Chicago; Elgin Butter Tub Co., Elgin, Ill.; Chicago Brass Works, Kenosha, Wis.; Howard Paper Co., Appleton, Wis.; McCormick Harvester Co., Chicago; Chicago Dock Co., Chicago; U. S. Filler Machine Co., Tama, Iowa; Chicago-Rockford Hosiery Co., Kenosha, Wis.; Marinette & Menominee Paper Co., Marinette, Wis.

The Drake & Stratton Co. has been awarded the contract by Laughlin & Co. for the construction of the large ore stock

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**Regenerative Gas Furnaces and Water Seal Gas Producers.**

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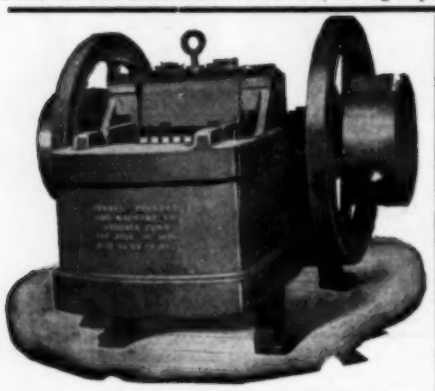

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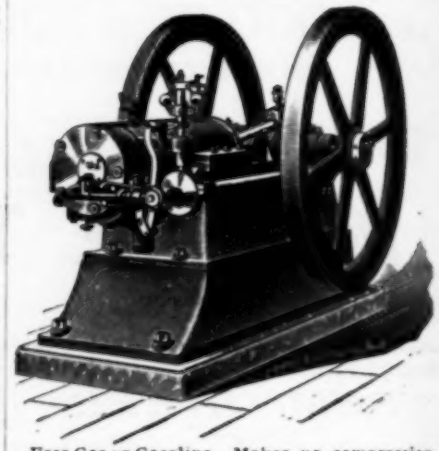
**If you are thinking of enlarging your mill, foundry or machine shop, or of purchasing machinery of any kind, send us a line giving character of machinery needed. We can put you in communication with manufacturers from whom you can buy advantageously.**

**The Brown GAS AND GASOLINE Engine.**



Uses Gas or Gasoline. Makes no compression while engine is running idle. Charges fired with electric spark tube igniter. Made upon honor and fully guaranteed. Write for description and prices.

**Columbus Machine Co.,**

COLUMBUS, O.


yard at the Eliza Furnaces, and for the remodeling of the freight yards of Jones & Laughlins, and the Monongahela Connecting R. R., at that point. This is the beginning of the remodeling and modernizing of the blast furnace plant. The improvements will cost about $150,000.

The Economic Power Co., of Rochester, N. Y., has placed orders with the American Tool Works Co., of Cincinnati, for a number of lathes, planers, and milling machines, which will be placed in its shops at Indianapolis, Ind. The American Tool Works Co. has also received orders through its office at Stockholm, Sweden, for a full line of engine lathes ranging from 14-inch to 30-inch swing; through its office at St. Petersburg, Russia, an order for lathes, planers, shapers, drill presses and bolt cutters, which will be placed in the locomotive works in that city. Increased activity in machine shops in Mexico has caused inquiries for machine tools to come in more freely, the company having booked a number of large orders from that country in the past week, chief among them being one from Compania Agricola del Tlahualita, Ltd., at Zaragoza, Mex., for a number of planers, lathes and shapers.

The one-piece steel gun manufactured by the Otis Steel Co., Cleveland, under the specifications of Dr. R. J. Gatling, is now at the Navy Yard at Washington. It will be taken thence, after being rifled, and fitted with a breech lock, to the Sandy Hook proving ground. It is 26 feet long, and weighs about 22 tons.

A Wall street statement concerning the stock of the Cramp Ship Building & Engine Co. is made as follows: "This company paid dividends for some years at the rate of from 6 to 8 per cent per annum, distributing $2,367,060 in cash and also $808,000 in stock among its shareholders between Oct. 15, 1890, and Dec. 14, 1895. On account of bad times following the Wilson tariff bill they were compelled to stop the payment of dividends, and finding themselves with a floating debt of $1,500,000 they arranged with Drexel & Co. to fund same. This debt has been entirely extinguished and the company now has a handsome surplus represented by cash, bills receivable and materials on hand."

The tin plate plant of the Stickney Iron Co., at Locust Point, Md., now operated by the Humbert Tin Plate Co., Connellsville, Pa., will be operated by the owners after May 1.

The McKenna Steel Working Co., recently resumed operations in its rolling mill, at Joliet, Ill. The company rerolls partly worn steel rails into perfect rails of slightly lighter section. They expect to have its new mill at Kansas City, Mo., in running order by July 1.

Rouse & Hills, dealers in plumbers' supplies, Cleveland, have assigned, with assets and liabilities of $60,000.

The Bradley Pulverizer Co., Boston, has an order for four pulverizers from the Illinois Steel Co., Chicago, for use in its new works, now under construction, for the manufacture of cement.

The McMyler Mfg. Co., Cleveland, has an order from the Cleveland, Lorain & Wheeling Ry. for one coal unloader for the docks at Lorain, O., to cost $50,000, including tracks and docks.

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THE proper lubrication of gas engine cylinders has been a difficult problem. An official of the Pennsylvania Railroad Co. writes as follows: "I had a gas engine at Sharon, Pa., running a pump, and the man that had charge of it allowed the lubricator to run dry and cut the piston, piston rings and cylinder. The makers of the gas engine said the cylinder would have to be sent to the shop and bored out and a new piston put in. It was our busy season and we could not do without water. I had some of Dixon's finely pulverized

graphite, and I commenced to feed it into the cylinder through the suction pipe with the air and gas with immediate relief. After about two weeks the engine was running smoother and using less gas than ever before. I had this same engine apart last Saturday, and every place that was cut is smooth as glass. This one instance saved us about $75. I have great faith in this graphite and always keep it on hand."

## GUIDE TO WASHINGTON, D. C.

### Sent Free to Teachers and Tourists.

It contains special information about places of interest, also complete and comprehensive map of the National Capital, time of through trains to Washington via Pennsylvania Short Lines, and reduced rates over that route for the National Educational Association meeting in July. Just the thing for teachers and any one going to Washington. Address C. L. Kimball, Assistant General Passenger Agent, Cleveland, Ohio, enclosing two-cent stamp. The Guide is worth much more.

## REDUCED FARES.

### To Various Points via Pennsylvania Lines.

Excursion tickets will be sold via Pennsylvania Lines as indicated in the following paragraphs. Although concessions in fare are authorized for meetings of certain Orders, tickets may be obtained by any person whether a member of the Order or interested in the event. The reduced rates will be open to everybody.

To New Orleans, La.—May 6th, 7th and 8th, account meeting B. P. O. Elks. Return limit fifteen days.

To Warsaw, Ind., (Winona Lake).—May 16th, 17th, 18th, 19th, 20th and 21st, good returning until June 3d, account Presbyterian General Assembly.

To Dayton, O.—May 23d and 24th, from points in Ohio only, account Knights of Pythias Grand Lodge of Ohio; good to return until May 25th.

To Columbus, O.—May 24th and 25th, account State Conventions of People's Party, Liberal Party and Silver Republicans, from Ohio points only. Return limit May 26th.

To Dallas, Texas—June 11th and 12th, account meeting of Nobles of Mystic Shrine. Return limit, June 28th.

To Columbus, O.—June 13th and 14th, good returning until June 17th, for State Sunday School Convention. From points in Ohio only.

To Mt. Vernon, Ohio—June 13th and 14th good to return until June 17th for State G. A. R. Encampment. Excursion rates in effect from points in Ohio only.

To Louisville, Ky.—June 19th and 20th, for Jr. O. U. A. M. National Council Meeting. Return limit June 26th.

To Mansfield, Ohio—June 27th and 28th, for State Christian Endeavor Convention. From points in Ohio only; good returning until July 1st.

To Washington, D. C.—July 3d, 4th, 5th and 6th, for the National Educational Association Meeting. Good to return July 15th, with privilege to extend return limit until August 31st.

To Indianapolis, Ind.—August 8th and 9th, for L. A. W. National Meet. Return limit, August 15th.

To Richmond, Ind.—August 19th and 20th, good returning until August 28th, account Society of Friends Conference.

To Indianapolis, Ind.—August 20th, 21st and 22nd for Knights of Pythias Grand Encampment and Supreme Lodge Session. Return limit August 30th, with privilege to extend until September 10th.

To Cincinnati, Ohio—September 3d, 4th, 5th and 6th, for the G. A. R. National Encampment. Good returning until September 13th, with privilege of extension until October 2nd.

To Pittsburg, Pa.—October 8th, 9th, 10th, 11th, 12th and 13th, good returning until October 17th, account Knights Templar Triennial Conclave. Return limit may be extended until October 31st.

During the excursion season special rates will also be in effect via Pennsylvania Lines for special and local events. For particular information, please apply to nearest Ticket Agent of the Pennsylvania Lines, or address C. L. Kimball, Assistant General Passenger Agent, Cleveland, Ohio.


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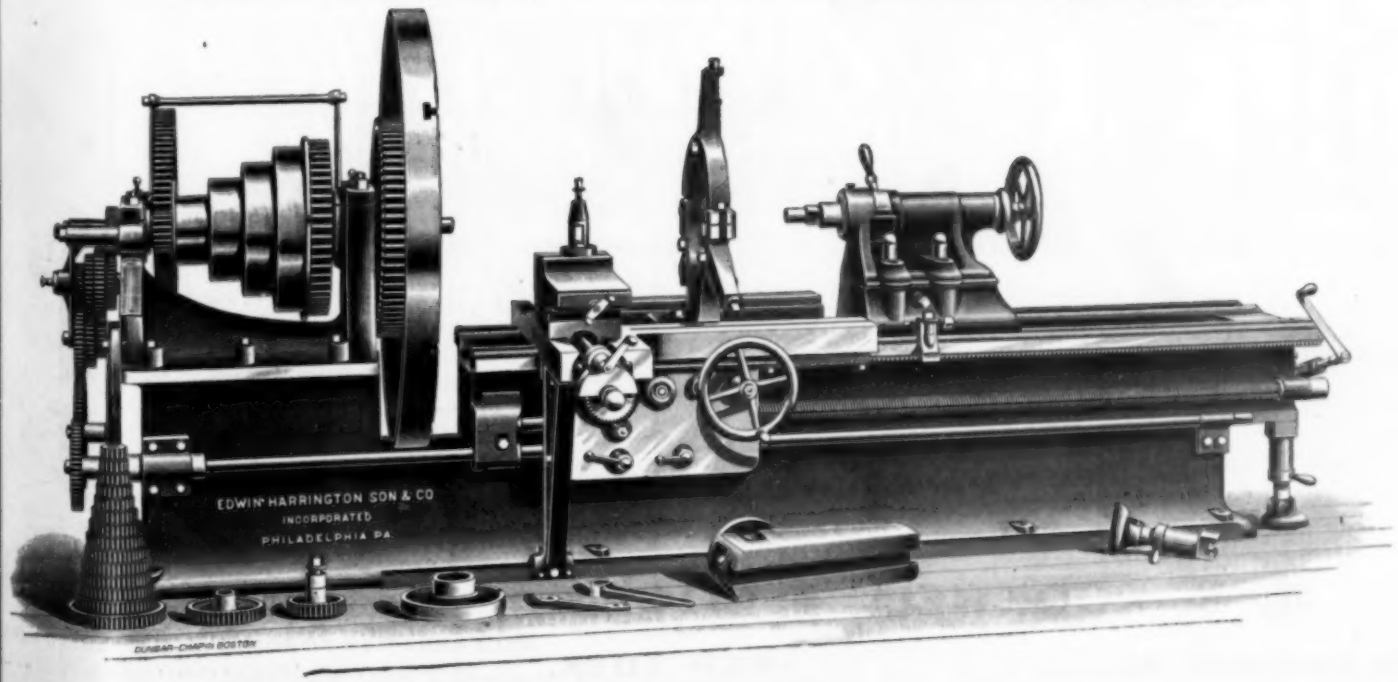

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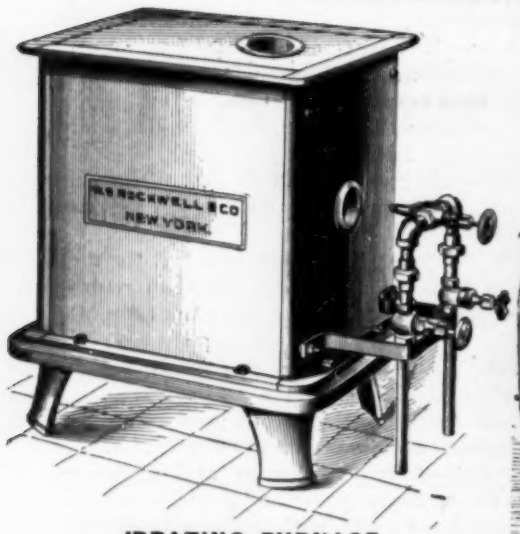


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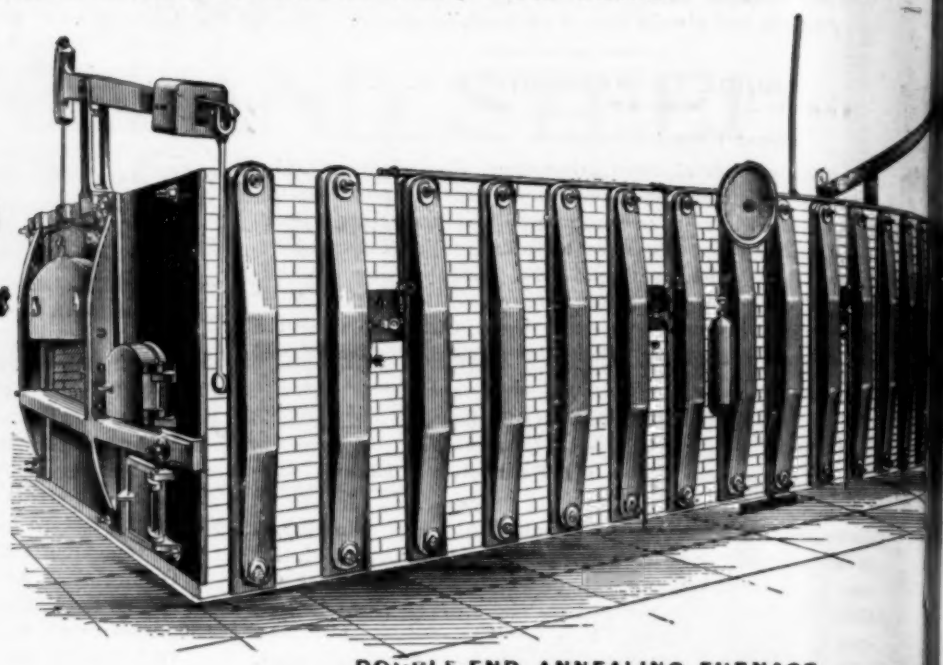

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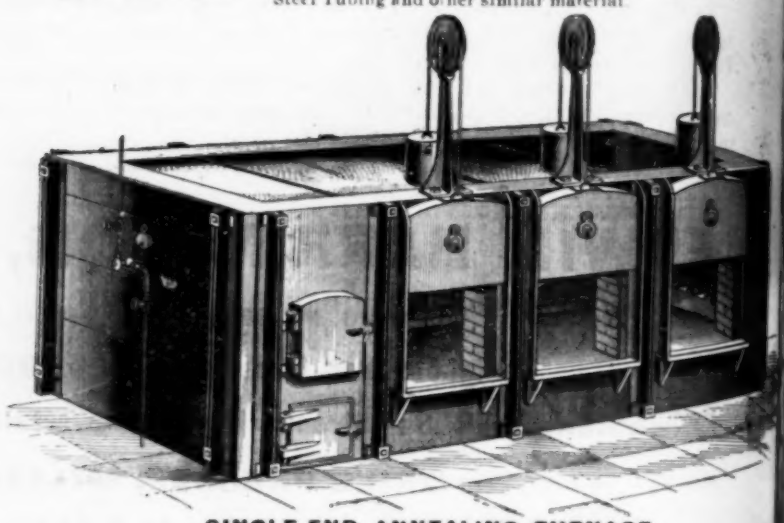

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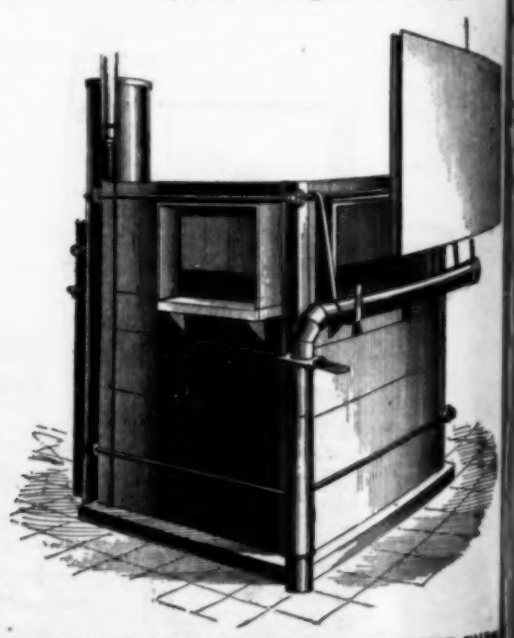

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